

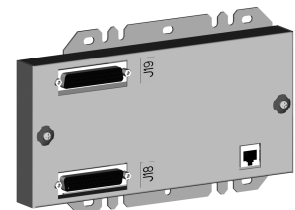
SYSTEM OVERVIEW

Description: A programmable monitoring, controlling, and data acquisition system designed for use in telecommunications power sites.

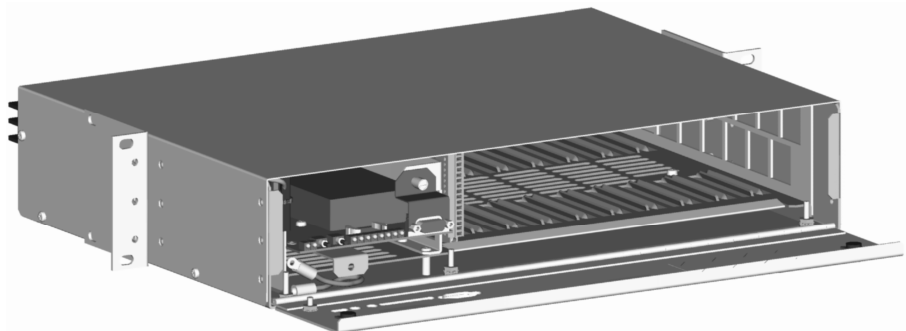
- Consists of a Main Cabinet which holds up to ten input/output circuit cards, in a cabinet size that occupies two 19" or 23" relay rack spaces. For system expansion and/or to monitor points at other locations, Supplemental (Expansion) Cabinets are available. Each Expansion Cabinet holds up to ten input/output circuit cards, in a cabinet size that occupies two 19" or 23" relay rack spaces. Also available are Expansion Assemblies which provide an input circuit card equipped with a fixed number of analog and binary input points in a sheet metal housing. These assemblies can be mounted inside customer equipment. The Main Cabinet, Expansion Cabinets, and Expansion Assemblies are interconnected via the LMS1000 network.
- The Main Cabinet and Expansion Cabinets can be equipped with various input circuit cards to monitor a variety of analog, binary, and temperature points. The Expansion Assemblies are always equipped with an input circuit card to monitor a fixed number of analog and binary points.
- LMS1000 collects data from the input circuit cards. The data collected is used for alarm processing and reporting, and to provide statistics.
- LMS1000 is capable of reporting alarm conditions to a remote terminal, pager, or Email address. For remote terminal or pager notification, the Main CPU circuit card must be equipped with the optional modem. Two types of alarm reporting mechanisms are provided, System Alarm Reporting and Individual User Alarm Reporting.



Main Cabinet
(Expansion Cabinet Similar)



Expansion Assembly



- LMS1000 is capable of reporting alarm conditions via SNMP traps over Ethernet, or via TL1 (over Ethernet) when the 'TL1 over Ethernet' option is ordered. TL1 is also available via a serial connection in 'direct mode'.
- The Main CPU circuit card provides programmable LEDs to allow local indication of alarm conditions or occurrences. For remote indication, the Main and/or Expansion Cabinets can be equipped with output circuit cards which provide programmable relays. These relays may also be used to control other equipment.
- LMS1000 easily interfaces with the MCA of Vortex® Power Systems (VPS) and NETSURE™ Power Systems (NPS). This interface allows an LMS1000 user to remotely monitor, adjust, and control the Power System via LMS1000; plus easily use the features of LMS1000 with the Power System. Separate analog, binary, and relay circuit cards do not have to be supplied for this interface. Analog, binary, relay, and temperature circuit cards (I/O cards) can be provided to monitor equipment external to the Power System. In a VPS/NPS, one simple cable connection between the Main Cabinet and the VPS/NPS completes the interconnections required. Note that the LMS1000 is factory integrated into Spec. Nos. 582140000, 582140001, and 582126100 NETSURE Power Systems.

Note that Spec. Nos. 582140000, 582140001, and 582126100 NETSURE Power Systems do not use the LMS1000 Cabinets. The LMS1000 is factory integrated into the Power Systems. Note that LMS1000 I/O circuit card mounting positions are provided inside a 582140000, 582140001, and 582126100 NETSURE Power System.

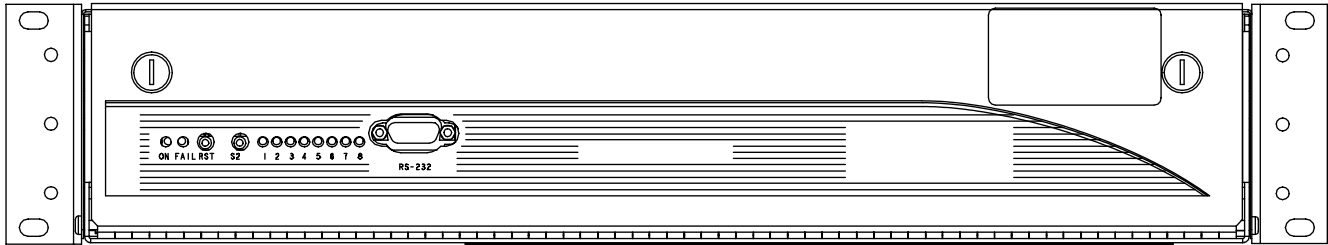
- LMS1000 can be accessed via a local port, a modem port (when optional modem is ordered), an optional TL1 port, and an Ethernet port (for Telnet access, Web access, SNMP access, optional TL1 access, and Email alarm reporting). A local front panel display option is also available.
- Available software options include...
 - Power Metering
 - Energy Management*
 - Rectifier/PCU Sequencing*
 - TL1/X.25
 - TL1 (over Ethernet)
 - Gateway Port
 - LMS Dual MCA Interface

*** Note:** *LMS1000 Energy Management and Sequencing features are not for use in the Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.*

- Available specialty interfaces include...
 - Door Access Controller Interface
 - External GPS Modem Interface
 - AC Analyzer Interface

| | |
|------------------|---|
| Family: | LMS Series |
| Spec. No.: | 586505000 and 586505500 |
| Model: | LMS1000 |
| Agency Approval: | UL Recognized to UL 1950 CSA 22.2, No. 950 |
| Framework Type: | Main and Expansion Cabinets: Mounted in a Customer Provided 19 or 23 Inch Wide Rack |
| Mounting Width: | Main and Expansion Cabinets: 19 or 23 Inch (Relay Rack Mounting) |
| Mounting Depth: | Main and Expansion Cabinets: 13.250 Inches |
| Mounting Height: | Main and Expansion Cabinets: 3.470 Inches |
| Access: | Front and Rear for Installation and Maintenance, Front for Operation |
| Color: | 586505000: Off-White (Lorain Spec. M500-117) 586505500: Textured Gray (Lorain Spec. M500-147) |
| Options: | Main Cabinet - 19"/23" , Main Cabinet - 23" only , Expansion Cabinets - 19"/23" , Expansion Cabinets - 23" only , Expansion Assemblies , (4) Input Analog Card , (8) Input Temperature Card , (8) Input Analog Card , (12) Input Analog Card for Measuring Individual Battery Cell Voltages , (4) Input Binary Card , (8) Input Binary Card , (4) Output Form-C Relay Card , Front Panel Display Option for 19" Cabinets (later version cabinets) , Front Panel Display Option for 19" Cabinets (earlier version cabinets) , Front Panel Display Option for 23" Cabinets (requires 10th I/O slot) , Front Panel Display Option for 23" Cabinets (DOES NOT require 10th I/O slot) , Modem , LMS Dual MCA Interface Software Option , Gateway Port Software Option , Door Access Controller Interface , PCU/Rectifier Sequencing Software Option , Energy Management Software Option , External GPS Modem Interface , AC Analyzer Interface , TL1/X.25 Software Option , Power Metering Software Option , Local Port Redirection Option , TL1 (over Ethernet) Software Option , MCA Interface Cable Options , Current Limit Resistor Kits , In-Line Fuse Kits , Temperature Sensors |
| Accessories: | In-Line Fuse Kit , Replacement CPU Memory Backup Battery , LMS1000 Network Cable Options , 130VDC Monitoring Wire Harness |
| Environment: | -40°C to +60°C (-40°F to +140°F) |

586505000 and 586505500



Main Cabinet
(Expansion
Cabinets
Similar)
(19" Cabinet
Shown)

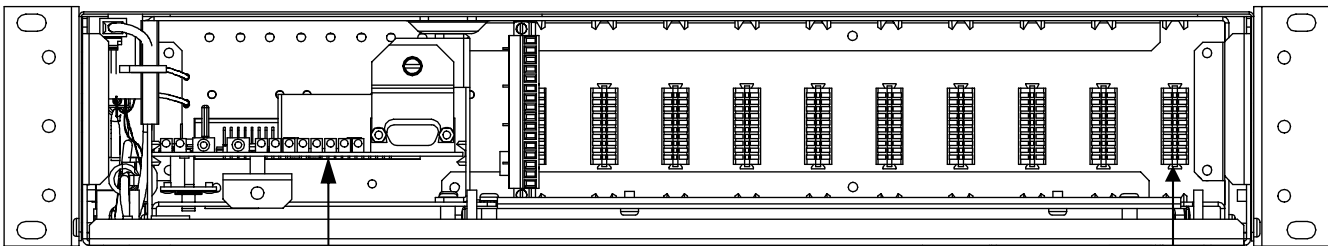
[List 1:](#) LMS1000 Monitoring System
(MAIN CABINET - 19"/23")

[List 2:](#) LMS1000 Monitoring System
(MAIN CABINET - 23" only)

[List 6:](#) LMS1000 Monitoring System
(EXPANSION CABINETS - 19"/23")

[List 7:](#) LMS1000 Monitoring System
(EXPANSION CABINETS - 23" only)

[List 10:](#) LMS1000 Monitoring System
(EXPANSION ASSEMBLIES) (not shown)



P/O [List 1](#) and [List 6](#): CPU Circuit Card

[List 70:](#) Modem Circuit Card
(MAIN CABINET ONLY)

[List 92:](#) VPS MCA Interface Cable,
Customer Specified Length
[List 93:](#) VPS MCA Interface Cable
Termination Kit
[List 94:](#) VPS MCA Interface Cable,
Pre-Assembled, 6'

Front Door
Opened in
Illustration

Standard Software Features

[WEB Interface Software Feature](#)

[SNMP Software Feature](#)

Available Software Options

[List 78:](#) LMS Dual MCA Interface
Software Option

[List 79:](#) Gateway Port Software Option

[List 82:](#) PCU/Rectifier Sequencing
Software Option

[List 83:](#) Energy Management Software Option

[List 86:](#) TL1/X.25 Software Option

[List 87:](#) Power Metering Software Option

[List 88:](#) Local Port Redirection

[List 90:](#) TL1 (over Ethernet) Software Option

Available Specialty Interfaces

[List 80:](#) Door Access Controller
Interface

[List 84:](#) External GPS Modem
Interface

[List 85:](#) AC Analyzer Interface

Front Panel Display Option

[List 60:](#) (for use in later
version 19" cabinets)

[List 61:](#) (for use in earlier
version 19" cabinets)

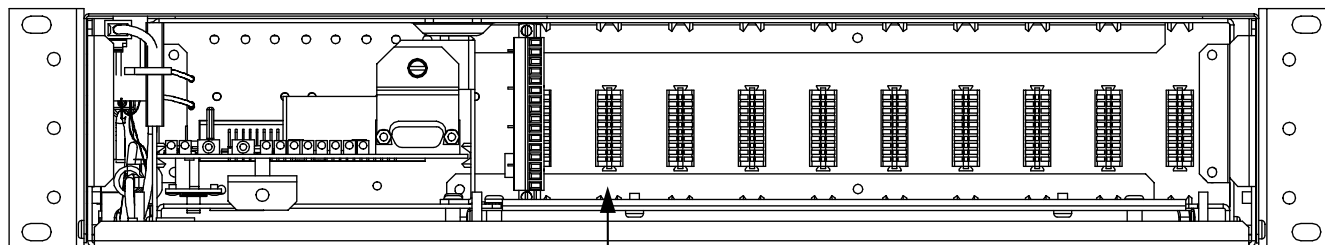
[List 62:](#) (for use in 23" cabinets)
(requires 10th I/O slot)

[List 63:](#) (for use in 23" cabinets)
(DOES NOT require 10th
I/O slot)

Determines
Earlier vs. Later
Version 19" Cabinets

I/O Slot #10 has a
Larger (30 pos.)
Connector

I/O Slot #10 is the
Same as the Other I/O
Slots



Main Cabinet
(Expansion Cabinets Similar)
(19" Cabinet Shown)

Front Door
Opened in
Illustration

**Available Input/Output (I/O)
Circuit Cards**

[List 20:](#) Four (4) Input Analog
Circuit Card

[List 21:](#) Eight (8) Input
Temperature Circuit
Card

[List 22:](#) Eight (8) Input Analog
Circuit Card

[List 23:](#) Twelve (12) Input
Analog Circuit Card
for Measuring
Individual Battery Cell
Voltages

[List 30:](#) Four (4) Input Binary
Circuit Card

[List 31:](#) Eight (8) Input Binary
Circuit Card

[List 40:](#) Four (4) Output
Form-C Relay Circuit
Card

List [BA](#), [BB](#), and [BC](#): Current Limit
Resistor Kits

List [BE](#), [BF](#),
and P/N [535135](#): In-Line Fuse
Kits

List [ST](#) and [SU](#): Temperature
Sensors

SEE ALSO

[System Overview](#)
[Table of Contents](#)
[List Structure Table](#)
[Accessories](#)
[Specifications](#)
[Dimensional Drawings](#)
[Related Documentation](#)

TABLE OF CONTENTS

| System Overview | Picture | Ordering Information | | Specifications | Physical Size Information | Related Documentation |
|---|-------------------------|--------------------------------------|--|--------------------------------|---|---------------------------------------|
| | | List Descriptions | Accessory Descriptions | | | |
| SYSTEM OVERVIEW | | | | | | 1 |
| TABLE OF CONTENTS | | | | | | 6 |
| ORDERING INFORMATION | | | | | | 8 |
| List Options | | | | | | 8 |
| Accessory Options | | | | | | 11 |
| LIST DESCRIPTIONS | | | | | | 12 |
| List 1: Common Equipment for the LMS1000 Main Cabinet | | | | | | 12 |
| List 2: Common Equipment for the LMS1000 Main Cabinet | | | | | | 12 |
| List 6: Common Equipment for One (1) LMS1000 Expansion Cabinet | | | | | | 13 |
| List 7: Common Equipment for One (1) LMS1000 Expansion Cabinet | | | | | | 13 |
| List 10: Common Equipment for One (1) LMS1000 Expansion Assembly | | | | | | 14 |
| List 20: Four (4) Input Analog Circuit Card | | | | | | 14 |
| List 21: Eight (8) Input Temperature Circuit Card | | | | | | 15 |
| List 22: Eight (8) Input Analog Circuit Card | | | | | | 15 |
| List 23: Twelve (12) Input Analog Circuit Card for Measuring Individual Battery Cell Voltages | | | | | | 16 |
| List 30: Four (4) Input Binary Circuit Card | | | | | | 16 |
| List 31: Eight (8) Input Binary Circuit Card | | | | | | 17 |
| List 40: Four (4) Output Form-C Relay Circuit Card | | | | | | 17 |
| List 60: LMS1000 Display Option (for use in later version 586505000 19" cabinets) | | | | | | 18 |
| List 61: LMS1000 Display Option (for use in earlier version 586505000 19" cabinets) | | | | | | 19 |
| List 62: LMS1000 Display Option (for use in 586505000/586505500 23" cabinets) | | | | | | 20 |
| List 63: LMS1000 Display Option (for use in 586505000/586505500 23" cabinets) | | | | | | 20 |
| List 70: Modem Circuit Card | | | | | | 21 |
| List 78: LMS Dual MCA Interface Software Option | | | | | | 21 |
| List 79: Gateway Port Software Option | | | | | | 21 |
| List 80: Door Access Controller (DAC) Interface | | | | | | 22 |
| List 82: PCU/Rectifier Sequencing Software Option | | | | | | 22 |
| List 83: Energy Management Software Option | | | | | | 23 |
| List 84: External GPS Modem Interface | | | | | | 23 |
| List 85: AC Analyzer Interface | | | | | | 23 |
| List 86: TL1/X.25 Software Option | | | | | | 24 |
| List 87: Power Metering Software Option | | | | | | 24 |
| List 88: Local Port Redirection to OEM 1 Port Option | | | | | | 24 |
| List 90: TL1 (over Ethernet) Software Option | | | | | | 25 |
| List 92: MCA Interface Cable, Customer Specified Length | | | | | | 25 |
| List 93: MCA Interface Cable Termination Kit | | | | | | 25 |
| List 94: MCA Interface Cable, Pre-assembled | | | | | | 26 |
| List BA: Current Limit Resistor Kit | | | | | | 26 |
| List BB: Current Limit Resistor Kit | | | | | | 26 |
| List BC: Current Limit Resistor Kit | | | | | | 26 |
| List BE: In-Line Fuse Kit | | | | | | 27 |
| List BF: In-Line Fuse Kit | | | | | | 27 |
| List ST: Temperature Sensor | | | | | | 27 |
| List SU: Temperature Sensor | | | | | | 27 |

| | |
|---|-----------|
| ACCESSORY DESCRIPTIONS..... | 29 |
| In-Line Fuse Kit, P/N 535135 | 29 |
| Replacement CPU Memory Backup Battery | 29 |
| LMS1000 Network Cables | 29 |
| 130VDC Monitoring Wire Harness | 30 |
| SPECIFICATIONS..... | 31 |
| 1. 586505000/586505500 LMS1000 System | 31 |
| 1.1 Environmental Ratings | 31 |
| 1.2 Firmware Specifications | 31 |
| 1.3 Node Specifications..... | 31 |
| 1.4 Software Features | 32 |
| 1.5 Standard Software Features | 42 |
| 1.6 Available Software Options | 43 |
| 1.7 Specialty Interfaces | 48 |
| 2. 586505000/586505500 LMS1000 Main Cabinet..... | 48 |
| 2.1 Input Ratings | 48 |
| 2.2 Mounting..... | 49 |
| 2.3 I/O Circuit Card Mounting Positions | 49 |
| 2.4 CPU Circuit Card, Part No. 545476 (used in 586505000/586505500) and 545558 (used in 582140000, 582140001, and 582126100)..... | 49 |
| 2.5 LMS1000 Front Panel Display Option..... | 52 |
| 2.6 Optional Modem Circuit Card, Part No. 508951..... | 53 |
| 3. 586505000/586505500 LMS1000 Expansion Cabinet..... | 57 |
| 3.1 Input Ratings | 57 |
| 3.2 Mounting..... | 57 |
| 3.3 I/O Circuit Card Mounting Positions | 57 |
| 3.4 CPU Circuit Card, Part No. 506153 (also used in 582140000, 582140001, and 582126100 Secondary Bays)..... | 57 |
| 4. 586505000/586505500 LMS1000 Expansion Assembly..... | 57 |
| 4.1 Input Ratings | 57 |
| 4.2 Mounting..... | 57 |
| 4.3 I/O Connector Pinouts | 57 |
| 4.4 CPU Circuit, P/O Part No. 507606 | 58 |
| 5. Input/Output (I/O) Circuit Cards | 58 |
| 5.1 Four (4) Input Analog Circuit Card, Part No. 506336..... | 58 |
| 5.2 Eight (8) Input Analog Circuit Card, Part No. 514528 | 58 |
| 5.3 Twelve (12) Input Analog Circuit Card, Part No. 520838..... | 59 |
| 5.4 Four (4) Input Binary Circuit Card, Part No. 506332 | 59 |
| 5.5 Eight (8) Input Binary Circuit Card, Part No. 506334 | 59 |
| 5.6 Four (4) Output Form-C Relay Circuit Card, Part No. 506335..... | 59 |
| 5.7 Eight (8) Input Temperature Circuit Card, Part No. 506333..... | 59 |
| PHYSICAL SIZE INFORMATION | 60 |
| Overall Dimensions (586505000 Main [List 1] and Expansion [List 6] Cabinets) | 60 |
| Overall Dimensions (586505000/586505500 Main [List 2] and Expansion [List 7] Cabinets) | 61 |
| Overall Dimensions (586505000/586505500 Expansion Assembly)..... | 62 |
| Connector Locations (586505000/586505500 Main Cabinet) | 63 |
| Connector Locations (586505000/586505500 Expansion Cabinet) | 64 |
| Connector Locations (586505000/586505500 Expansion Assembly) | 65 |
| RELATED DOCUMENTATION..... | 68 |
| REVISION RECORD..... | 69 |

ORDERING INFORMATION

List Options

Order the following by the items Part Number as specified in the following table.

When viewing electronically, click on the [link](#) to jump to the detailed description page.

| List # | Part Number | Description | Mounting Positions (1U = 1-3/4") | Notes |
|---|----------------------------|---|-------------------------------------|-------|
| COMMON EQUIPMENT | | | | |
| 1 | 58650500001 | Common Equipment for the LMS1000 MAIN CABINET, includes ... Main Cabinet - 19"/23" (off-white) Main Cabinet CPU Circuit Card | 2U | -- |
| 2 | 58650500002 58650550002 | Common Equipment for the LMS1000 MAIN CABINET, includes ... Main Cabinet - 23" only (586505000 off-white) 23" only (586505500 gray) Main Cabinet CPU Circuit Card | 2U | -- |
| 6 | 58650500006 | Common Equipment for One (1) LMS1000 EXPANSION CABINET, includes ... Expansion Cabinet - 19"/23" (off-white) Expansion Cabinet CPU Circuit Card | 2U | -- |
| 7 | 58650500007 58650550007 | Common Equipment for One (1) LMS1000 EXPANSION CABINET, includes ... Expansion Cabinet - 23" only (586505000 off-white) 23" only (586505500 gray) Expansion Cabinet CPU Circuit Card | 2U | -- |
| 10 | 58650500010 58650550010 | Common Equipment for One (1) LMS1000 EXPANSION ASSEMBLY, includes ... CPU/Input Circuit Card Sheet Metal Covering | -- | -- |
| INPUT/OUTPUT (I/O) CIRCUIT CARDS (for use in List 1, 2, 6, and 7 cabinets, and the Spec. Nos. 582140000, 582140001, and 582126100 Power Systems) | | | | |
| 20 | 58650500020 58650550020 | Four (4) Input Analog Circuit Card | -- | -- |
| 21 | 58650500021 58650550021 | Eight (8) Input Temperature Circuit Card | -- | -- |
| 22 | 58650500022 58650550022 | Eight (8) Input Analog Circuit Card | -- | -- |
| 23 | 58650500023 58650550023 | Twelve (12) Input Analog Circuit Card for Measuring Individual Battery Cell Voltages (not for use in a List 6 and 7 cabinets) | -- | -- |
| 30 | 58650500030 58650550030 | Four (4) Input Binary Circuit Card | -- | -- |

[Home](#)

| List # | Part Number | Description | Mounting Positions (1U = 1-3/4") | Notes |
|---------------------------------------|----------------------------|--|-------------------------------------|-------|
| 31 | 58650500031 58650550031 | Eight (8) Input Binary Circuit Card | -- | -- |
| 40 | 58650500040 58650550040 | Four (4) Output Form-C Relay Circuit Card | -- | -- |
| 70 | 58650500070 58650550070 | Modem Circuit Card (for use in 586505000/586505500 Lists 1 and 2, or 582140000/582140001/582126100 Primary Bay only) | -- | -- |
| STANDARD SOFTWARE FEATURES | | | | |
| -- | -- | WEB Interface Software Feature | -- | -- |
| -- | -- | SNMP Software Feature | -- | -- |
| AVAILABLE SOFTWARE OPTIONS | | | | |
| 78 | 58650500078 58650550078 | LMS Dual MCA Interface Software Option | -- | -- |
| 79 | 58650500079 58650550079 | Gateway Port Software Option | -- | -- |
| 82 | 58650500082 58650550082 | PCU/Rectifier Sequencing Software Option | -- | -- |
| 83 | 58650500083 58650550083 | Energy Management Software Option | -- | -- |
| 86 | 58650500086 58650550086 | TL1/X.25 Software Option | -- | -- |
| 87 | 58650500087 58650550087 | Power Metering Software Option | -- | -- |
| 88 | 58650500088 58650550088 | Local Port Redirection to OEM 1 Port Option | -- | -- |
| 90 | 58650500090 58650550090 | TL1 (over Ethernet) Software Option | -- | -- |
| AVAILABLE SPECIALTY INTERFACES | | | | |
| 80 | 58650500080 58650550080 | Door Access Controller Interface | -- | -- |
| 84 | 58650500084 58650550084 | External GPS Modem Interface | -- | -- |
| 85 | 58650500085 58650550085 | AC Analyzer Interface | -- | -- |
| FRONT PANEL DISPLAY OPTION | | | | |
| 60 | 58650500060 | (for use in later version 19" cabinets) | -- | -- |
| 61 | 58650500061 | (for use in earlier version 19" cabinets) | -- | -- |
| 62 | 58650500062 58650550062 | (for use in 23" cabinets - off-white) (for use in 23" cabinets - gray) (requires 10th I/O slot) | -- | -- |

| List # | Part Number | Description | Mounting Positions (1U = 1-3/4") | Notes |
|--|----------------------------|---|-------------------------------------|-------|
| 63 | 58650500063 58650550063 | (for use in 23" cabinets - off-white) (for use in 23" cabinets - gray) (DOES NOT require 10th I/O slot) | -- | -- |
| MCA INTERFACE CABLES for VPS (Vortex Power Systems) and NPS (NETSURE Power Systems) (not required for Spec. Nos. 582140000, 582140001, and 582126100 Power Systems) | | | | |
| 92 | 58650500092 58650550092 | Customer Specified Length (customer to assemble) | -- | -- |
| 93 | 58650500093 58650550093 | Cable Termination Kit for Above (customer to assemble) | -- | -- |
| 94 | 58650500094 58650550094 | 6' Pre-Assembled Cable | -- | -- |
| CURRENT LIMIT RESISTOR KITS | | | | |
| BA | 586505000BA 586505500BA | Current Limit Resistor Kit, 3/8" Ring Lug | -- | -- |
| BB | 586505000BB 586505500BB | Current Limit Resistor Kit, Splice | -- | -- |
| BC | 586505000BC 586505500BC | Current Limit Resistor Kit, 5/16" Ring Lug | -- | -- |
| IN-LINE FUSE KITS | | | | |
| BE | 586505000BE 586505500BE | In-Line Fuse Kits, 3/8" Ring Lug | -- | -- |
| BF | 586505000BF 586505500BF | In-Line Fuse Kits, 5/16" Ring Lug | -- | -- |
| -- | 535135 | In-Line Fuse Kit, 1/4" Ring Lug, 3/8" Ring Lug, or Butt Splice | -- | -- |
| TEMPERATURE SENSORS | | | | |
| ST | 586505000ST 586505500ST | Temperature Sensor, Mounts to 5/16 or M8 Stud | -- | -- |
| SU | 586505000SU 586505500SU | Temperature Sensor, Mounts to 1/4 or M6 Stud | -- | -- |

Accessory Options

Order the following by the items Part Number as specified in the following table.

When viewing electronically, click on the *link* to jump to the detailed description page.

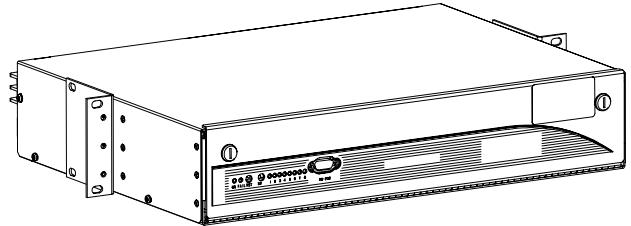
| ACCESSORIES | | | | |
|-------------|--|--|----|----|
| -- | Order by Part Number | Replacement CPU Memory Backup Battery | -- | -- |
| -- | Order by Part Number | LMS1000 Network Cables (when LMS1000 is used in a Spec. No. 582140000, 582140001, or 582126100 Power System; refer to SAG582140000, SAG582140001, or SAG582126100 for cable options) | -- | -- |
| -- | Order by Part Number | 130VDC Monitoring Wire Harness | -- | -- |

LIST DESCRIPTIONS

List 1: Common Equipment for the LMS1000 Main Cabinet

Features

- ◆ Provides the LMS1000 MAIN CABINET (19"/23" relay rack mounting) (off-white).
- ◆ Refer to the "[Specifications](#)" section of this document for further information.



Restrictions

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

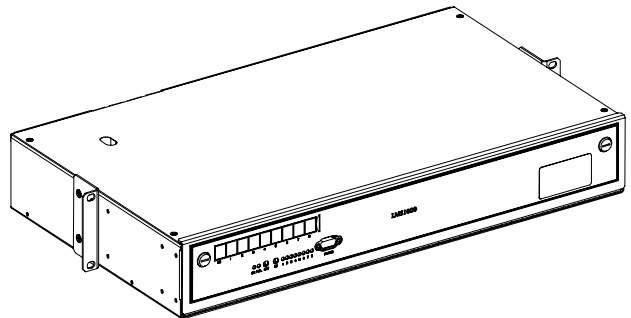
Ordering Notes

- 1) Order 586505000 List 1 (off-white).
- 2) Order Analog Circuit Cards as required per [List 20](#), [List 22](#), and [List 23](#).
- 3) Order Temperature Circuit Cards as required per [List 21](#).
- 4) Order Binary Circuit Cards as required per [List 30](#) and [List 31](#).
- 5) Order Relay Circuit Cards as required per [List 40](#).
- 6) Order Modem Circuit Card as required per [List 70](#).
- 7) Order Software Options as required per List [78](#), [79](#), [81](#), [82](#), [83](#), [86](#), [87](#), [88](#), [89](#), and/or [90](#).
- 8) Order Specialty Interfaces as required per [List 80](#), [List 84](#), and/or [List 85](#).
- 9) Order a MCA interconnect cable if required per [List 92](#) and [List 93](#), or [List 94](#).
- 10) Order Front Panel Display option as required per [List 60](#).
- 11) Order Accessories as required per the "[ACCESSORY](#)" section.

List 2: Common Equipment for the LMS1000 Main Cabinet

Features

- ◆ Provides the LMS1000 MAIN CABINET (23" only relay rack mounting) (586505000 off-white) (586505500 gray).
- ◆ Refer to the "[Specifications](#)" section of this document for further information.



Restrictions

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

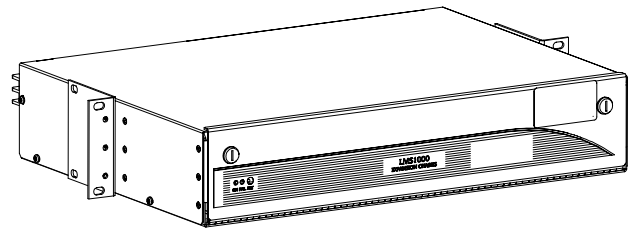
- 1) Order 586505000 List 2 (off-white) or 586505500 List 2 (gray).
- 2) Order Analog Circuit Cards as required per [List 20](#), [List 22](#), and [List 23](#).

- 3) Order Temperature Circuit Cards as required per [List 21](#).
- 4) Order Binary Circuit Cards as required per [List 30](#) and [List 31](#).
- 5) Order Relay Circuit Cards as required per [List 40](#).
- 6) Order Modem Circuit Card as required per [List 70](#).
- 7) Order Software Options as required per List [78](#), [79](#), [81](#), [82](#), [83](#), [86](#), [87](#), [88](#), [89](#), and/or [90](#).
- 8) Order Specialty Interfaces as required per [List 80](#), [List 84](#), and/or [List 85](#).
- 9) Order a MCA interconnect cable if required per [List 92](#) and [List 93](#), or [List 94](#).
- 10) Order Front Panel Display option as required per [List 62](#) or [List 63](#).
- 11) Order Accessories as required per the "[ACCESSORY](#)" section.

List 6: Common Equipment for One (1)
LMS1000 Expansion Cabinet

Features

- ◆ Provides one (1) LMS1000 EXPANSION CABINET (19"/23" relay rack mounting) (off-white).
- ◆ Refer to the "[Specifications](#)" section of this document for further information.



Restrictions

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

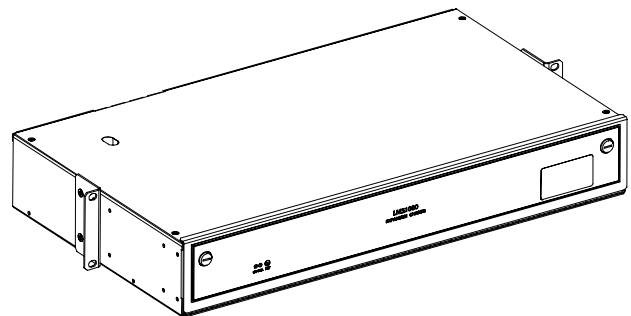
Ordering Notes

- 1) Order 586505000 List 6 (off-white).
- 2) Order Analog Circuit Cards as required per [List 20](#) and [List 22](#).
- 3) Order Temperature Circuit Cards as required per [List 21](#).
- 4) Order Binary Circuit Cards as required per [List 30](#) and [List 31](#).
- 5) Order Relay Circuit Cards as required per [List 40](#).

List 7: Common Equipment for One (1)
LMS1000 Expansion Cabinet

Features

- ◆ Provides one (1) LMS1000 EXPANSION CABINET (23" only relay rack mounting) (586505000 off-white) (586505500 gray).
- ◆ Refer to the "[Specifications](#)" section of this document for further information.



Restrictions

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order 586505000 List 7 (off-white) or 586505500 List 7 (gray).
- 2) Order Analog Circuit Cards as required per [List 20](#) and [List 22](#).
- 3) Order Temperature Circuit Cards as required per [List 21](#).
- 4) Order Binary Circuit Cards as required per [List 30](#) and [List 31](#).
- 5) Order Relay Circuit Cards as required per [List 40](#).

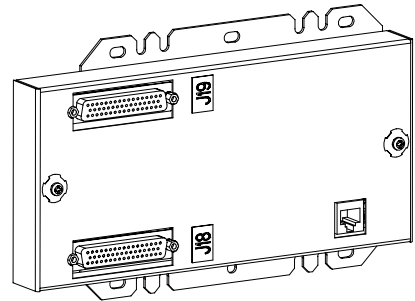
List 10: Common Equipment for One (1) LMS1000 Expansion Assembly

Features

- ◆ Provides one (1) LMS1000 EXPANSION ASSEMBLY.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Ordering Notes

- 1) Order as required to monitor fixed points outside an Emerson Network Power Power System.
- 2) Order LMS1000 network cables as required per the "[ACCESSORY](#)" section.
- 3) Also order the following as required to terminate customer wiring to the J18/J19 D-type connectors provided on the assembly.
 - a) D-Sub Connector Housing (Male): Emerson Network Power P/N 116694 (Tyco P/N 205212-3).
 - b) Crimp-Type Pins (Male): Emerson Network Power P/N 245381800 (Tyco P/N 66506-3 [supplied on a strip] or P/N 66506-9 [supplied loose]).
 - c) Cable Clamp Housing: Emerson Network Power P/N 116731 (Tyco P/N 748677-5).
 - d) Jack Screw Male Kit: Emerson Network Power P/N 116737 (Tyco P/N 747784).
 - e) Hand Crimping Tool: Pro Crimper II Tyco P/N 58448-2.



List 20: Four (4) Input Analog Circuit Card

Features

- ◆ Monitors voltages, shunts, and current loops.
- ◆ Each circuit card provides four (4) analog inputs to the system.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Not for use in Expansion Assemblies.

Maximum number of analog points that can be monitored is dependent on how many open I/O slots are available in the system network and maximum number of analog channels the system supports. Each 586505000/586505500 cabinet holds up to ten (10) I/O circuit cards. Refer to "[Firmware Specifications](#)" under "[Specifications](#)" in this document for number of analog channels supported.

Shunts should be protected by a 49.9 ohm resistor. All other analog inputs should be protected by a fuse in each lead.

Note: When LMS1000 is connected to an MCA, the MCA Interface does not require connections to analog, binary, or relay circuit cards. The MCA Interface provides analog inputs independently from the analog circuit cards installed.

Ordering Notes

- 1) Order one (1) List 20 analog circuit card for every four (4) analog points to be monitored using LMS1000.
- 2) Order current limit resistor kits as required per List [BA](#), [BB](#), and [BC](#).
- 3) Order in-line fuse kits as required per List [BE](#), [BF](#), or P/N [535135](#).
- 4) Also available is a 130VDC Monitoring Wire Harness. See [ACCESSORY INFORMATION](#) section for description. Order one (1) P/N 520839 130VDC Monitoring Wire Harness per 130VDC input to be monitored, as required.

List 21: Eight (8) Input Temperature Circuit Card

Features

- ◆ Monitors temperature probe inputs.
- ◆ Each circuit card provides eight (8) temperature inputs to the system (mapped as analog channels).
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Not for use in Expansion Assemblies.

Maximum number of temperature points that can be monitored is dependent on how many open I/O slots are available in the system network and maximum number of analog channels the system supports. Each 586505000/586505500 cabinet holds up to ten (10) I/O circuit cards. Refer to "[Firmware Specifications](#)" under "[Specifications](#)" in this document for number of analog channels supported.

Ordering Notes

- 1) Order one (1) List 21 temperature circuit card for every eight (8) temperature probes to be monitored using LMS1000.
- 2) Order temperature probes as required per List [ST](#) and [SU](#).

List 22: Eight (8) Input Analog Circuit Card

Features

- ◆ Monitors 50 mv shunt inputs.
- ◆ Each circuit card provides eight (8) analog inputs to the system.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Not for use in Expansion Assemblies.

Maximum number of analog points that can be monitored is dependent on how many open I/O slots are available in the system network and maximum number of analog channels the system supports. Each 586505000/586505500 cabinet holds up to ten (10) I/O circuit cards. Refer to "[Firmware Specifications](#)" under "[Specifications](#)" in this document for number of analog channels supported.

Shunt inputs should be protected by a 49.9 ohm resistor.

Note: When LMS1000 is connected to an MCA, the MCA Interface does not require connections to analog, binary, or relay circuit cards. The MCA Interface provides analog inputs independently from the analog circuit cards installed.

Ordering Notes

- 1) Order one (1) List 22 analog circuit card for every eight (8) analog points to be monitored using LMS1000.
- 2) Order current limit resistor kits as required per List [BA](#), [BB](#), and [BC](#).

List 23: Twelve (12) Input Analog Circuit Card for Measuring Individual Battery Cell Voltages

Features

- ◆ Monitors individual battery cell voltages.
- ◆ Each circuit card provides twelve (12) analog inputs to the system.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Not for use in Expansion Cabinets and Expansion Assemblies.

A maximum of six (6) cards may be installed in the Main Cabinet

Maximum number of analog points that can be monitored is dependent on how many open I/O slots are available in the system network and maximum number of analog channels the system supports. Each 586505000/586505500 cabinet holds up to ten (10) I/O circuit cards. Refer to "[Firmware Specifications](#)" under "[Specifications](#)" in this document for number of analog channels supported.

Analog inputs should be protected by a fuse in each lead.

Ordering Notes

- 1) Order one (1) List 23 analog circuit card for every twelve (12) battery cells to be monitored using LMS1000.
- 2) Order in-line fuse kits as required per List [BE](#), [BF](#), or P/N [535135](#).

List 30: Four (4) Input Binary Circuit Card

Features

- ◆ Monitors 0-60 volts AC/DC double ended binary inputs.
- ◆ Each circuit card provides four (4) binary inputs to the system. Each input requires two connections (source and return).
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Not for use in Expansion Assemblies.

Maximum number of binary points that can be monitored is dependent on how many open I/O slots are available in the system network and maximum number of binary channels the system supports. Each 586505000/586505500 cabinet holds up to ten (10) I/O circuit cards. Refer to "[Firmware Specifications](#)" under "[Specifications](#)" in this document for number of binary channels supported.

Note: When LMS1000 is connected to an MCA, the MCA Interface does not require connections to analog, binary, or relay circuit cards. The MCA Interface provides binary inputs independently from the binary circuit cards installed.

Ordering Notes

- 1) Order one (1) List 30 binary circuit card for every four (4) binary points to be monitored using LMS1000.
- 2) For recommended protection on input wiring, order current limit resistor kits as required per List [BA](#), [BB](#), and [BC](#).

List 31: Eight (8) Input Binary Circuit Card

Features

- ◆ Monitors 0-60 volts AC/DC single ended inputs.
- ◆ Each circuit card provides eight (8) binary inputs to the system. Each input requires only one connection (source), plus a single +BAT and/or -BAT connection for all inputs as required.
- ◆ The other connection point for each binary input is made via the placement of the appropriate jumper on the circuit card. This jumper either applies +BAT or -BAT to this connection point. This simplifies wiring to the binary inputs since +BAT and/or -BAT, as required, only has to be connected to the circuit card at one point.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Not for use in Expansion Assemblies.

Maximum number of binary points that can be monitored is dependent on how many open I/O slots are available in the system network and maximum number of binary channels the system supports. Each 586505000/586505500 cabinet holds up to ten (10) I/O circuit cards. Refer to "[Firmware Specifications](#)" under "[Specifications](#)" in this document for number of binary channels supported.

Note: *When LMS1000 is connected to an MCA, the MCA Interface does not require connections to analog, binary, or relay circuit cards. The MCA Interface provides binary inputs independently from the binary circuit cards installed.*

Ordering Notes

- 1) Order one (1) List 31 binary circuit card for every eight (8) binary points to be monitored using LMS1000.
- 2) For recommended protection on input wiring, order current limit resistor kits as required per List [BA](#), [BB](#), and [BC](#).

List 40: Four (4) Output Form-C Relay Circuit Card

Features

- ◆ Provides four relays each with one set of Form-C relay contacts.
- ◆ These relays are used for control or alarm applications and can be programmed by the user.
- ◆ Relays may also be manually forced "on" (energized) (SET RLY). Any relay forced on can also be manually turned off (CLR RLY). (A jumper is provided on the relay circuit card to enable/disable the SET RLY and CLR RLY commands.)
- ◆ The relay circuit cards can also be programmed to work with the energy management and/or sequential start option, if ordered (relays are not required to provide energy management and/or sequential start to a VPS/NPS Power System).
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Not for use in Expansion Assemblies.

Maximum number of relay outputs that can be provided is dependent on how many open I/O slots are available in the system network and maximum number of relay channels the system supports. Each 586505000/586505500 cabinet holds up to ten (10) I/O circuit cards. Refer to "[Firmware Specifications](#)" under "[Specifications](#)" in this document for number of relay channels supported.

Note: *When LMS1000 is connected to an MCA, the MCA Interface does not require connections to analog, binary, or relay circuit cards. When energy management and/or sequencing option is ordered, relays are not required to control the VPS/NPS PCUs.*

Note: *Also available in a Spec. No. 582140000, 582140001, and 582126100 Power System are MCA Customer Alarm Relay circuit cards. Refer to SAG582140000, SAG582140001, and SAG582126100.*

Ordering Notes

- 1) Order one (1) List 40 relay circuit card for every four (4) relay contacts to be provided by LMS1000.

List 60: LMS1000 Display Option (for use in later version 586505000 19" cabinets)

Features

- ◆ Provides a front panel display and keypad.
- ◆ Allows local access to the system without a terminal.
- ◆ You can view plant voltage and load current, view active alarms, perform channel scans, view the Events Log and Alarm Log, view channel statistics, and view battery discharge history.

Restrictions

There are two kits offered for the 19" cabinet. One kit is used with the earlier version cabinet, the other for the later version cabinet.

586505000 List 1 cabinets manufactured on or before 3/21/03, use kit P/N 524354 (586505000 List 61).

586505000 List 1 cabinets manufactured after 3/21/03, use kit P/N 524353 (586505000 List 60).

The later version cabinet has been modified to allow the LMS1000 Display Interface circuit card to be plugged into the 10th LMS1000 I/O circuit card mounting slot. To determine exactly which kit is compatible with your 19" cabinet, look at the LMS1000 I/O circuit card backplane connectors. If all backplane connectors are uniform, you have the earlier version cabinet and must use kit P/N 524354 (586505000 List 61). If the 10th I/O backplane connector is longer than the others, you have a later version cabinet that uses Kit P/N 524353 (586505000 List 60). See the following illustration.

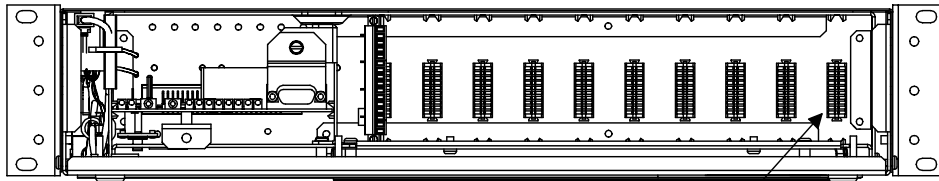
Requires the right-most I/O circuit card mounting slot.

Requires LMS1000 firmware 5.0.0 or later.

Requires use of the LMS1000 OEM2 Port. CANNOT be used if [List 84](#) ordered.

Not for use in 23" cabinets.

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.



Front Door
Opened in
Illustration

Determines earlier version vs. later version 19" cabinet.

Earlier Version Cabinet: I/O slot #10 is the same as the other I/O slots.
USE KIT P/N 524354 (586505000 List 61)

Later Version Cabinet: I/O Slot #10 has a larger (30 pos.) connector.
USE KIT P/N 524353 (586505000 List 60)

Ordering Notes

- 1) Order one (1) List 60 to provide a front panel display and keypad in a later version 586505000 19" cabinets. This option is factory installed if ordered with the system. This option is also field installable.

List 61: LMS1000 Display Option (for use in earlier version 586505000 19" cabinets)

Features

- ◆ Provides a front panel display and keypad.
- ◆ Allows local access to the system without a terminal.
- ◆ You can view plant voltage and load current, view active alarms, perform channel scans, view the Events Log and Alarm Log, view channel statistics, and view battery discharge history.

Restrictions

There are two kits offered for the 19" cabinet. One kit is used with the earlier version cabinet, the other for the later version cabinet.

586505000 List 1 cabinets manufactured on or before 3/21/03, use kit P/N 524354 (586505000 List 61).

586505000 List 1 cabinets manufactured after 3/21/03, use kit P/N 524353 (586505000 List 60).

The later version cabinet has been modified to allow the LMS1000 Display Interface circuit card to be plugged into the 10th LMS1000 I/O circuit card mounting slot. To determine exactly which kit is compatible with your 19" cabinet, look at the LMS1000 I/O circuit card backplane connectors. If all backplane connectors are uniform, you have the earlier version cabinet and must use kit P/N 524354 (586505000 List 61). If the 10th I/O backplane connector is longer than the others, you have a later version cabinet that uses Kit P/N 524353 (586505000 List 60). See the above illustration.

Requires LMS1000 firmware 5.0.0 or later.

Requires use of the LMS1000 OEM2 Port. CANNOT be used if [List 84](#) ordered.

Not for use in 23" cabinets.

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order one (1) List 61 to provide a front panel display and keypad in an earlier version 586505000 19" cabinets. This option is field installable.

List 62: LMS1000 Display Option (for use in 586505000/586505500 23" cabinets)

Features

- ◆ Provides a front panel display and keypad.
- ◆ Allows local access to the system without a terminal.
- ◆ You can view plant voltage and load current, view active alarms, perform channel scans, view the Events Log and Alarm Log, view channel statistics, and view battery discharge history.

Restrictions

Requires the right-most I/O circuit card mounting slot
(see [List 63](#) for a kit that DOES NOT require the right-most I/O slot).

Requires LMS1000 firmware 5.0.0 or later.

Requires use of the LMS1000 OEM2 Port. CANNOT be used if [List 84](#) ordered.

Not for use in 19" cabinets.

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order one (1) List 62 to provide a front panel display and keypad in a 23" cabinet. This option is factory installed if ordered with the system. This option is also field installable.
586505000 List 62 provides a new 23" off-white front panel.
586505500 List 62 provides a new 23" gray front panel.

List 63: LMS1000 Display Option (for use in 586505000/586505500 23" cabinets)

Features

- ◆ Provides a front panel display and keypad.
- ◆ Allows local access to the system without a terminal.
- ◆ You can view plant voltage and load current, view active alarms, perform channel scans, view the Events Log and Alarm Log, view channel statistics, and view battery discharge history.
- ◆ Similar to List 61 that DOES NOT require the use of the 10th I/O slot.

Restrictions

Requires LMS1000 firmware 5.0.0 or later.

Requires use of the LMS1000 OEM2 Port. CANNOT be used if [List 84](#) ordered.

Not for use in 19" cabinets.

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order one (1) List 63 to provide a front panel display and keypad in a 23" cabinet. This option is factory installed if ordered with the system. This option is also field installable.

586505000 List 63 provides a new 23" off-white front panel.
586505500 List 63 provides a new 23" gray front panel.

List 70: Modem Circuit Card

Features

- ◆ Provides for remote communications up to 56K BPS.
- ◆ An RJ-11 jack (for telephone line connection) is provided on the rear of the 586505000/586505500 cabinet. In a Spec. No. 582140000, 582140001, and 582126100 Power System; the RJ-11 jack located on the circuit card is used.
- ◆ Plugs onto the Main CPU circuit card.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

For use in a 586505000/586505500 Main Cabinet or 582140000/582140001/582126100 Primary Bay only.

Required for remote terminal or pager alarm notification via the System Alarm Reporting and/or Individual User Alarm Reporting mechanisms.

Ordering Notes

- 1) Order a List 70 modem circuit card if remote communications and/or alarm reporting over a telephone line is required.

List 78: LMS Dual MCA Interface Software Option

Features

- ◆ Allows the MCA in a Spec. No. 582140000, 582140001, or 582126100 NETSURE Power System (NPS) to interface with the MCA in a Vortex Power System (VPS) via the LMS.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Can only be used in the integrated LMS of a Spec. Nos. 582140000, 582140001, and 582126100 systems.

Operation of Energy Management is disabled when the Dual MCA Interface option is installed.

Ordering Notes

- 1) Order List 78 if a 582140000, 582140001, or 582126100 system is to interface with an MCA in a Vortex Power System (VPS) via the LMS.

List 79: Gateway Port Software Option

Features

- ◆ Allows the LMS1000 to emulate a "dumb" RS-232 asynchronous terminal interface. When installed, user input through either a local or remote LMS1000 port is directed to the customer equipment connected to the LMS1000 Gateway port.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

In the 586505000/586505500 system, the Gateway port is provided via the LMS1000 OEM1 port. CANNOT be used if [List 85](#), [List 86](#), or [List 88](#) ordered.

In the Spec. Nos. 582140000, 582140001, and 582126100 Power Systems; the Gateway port is provided via the port located on the front of the LMS1000 CPU circuit card installed in the Primary Bay.

Refer to the "[Specifications](#)" section of this document for further restrictions.

Ordering Notes

- 1) Order List 79 if a Gateway Port is required.
- 2) If you are connecting the Gateway Port to a DGU, also order null modem cable P/N 545562 (5') or 545783 (50'). This cable connects between the DGU and the LMS1000.

List 80: Door Access Controller (DAC) Interface

Features

- ◆ Configure and monitor the Door Access Controller via LMS1000.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Interfaces to a Desarrollos Digitales Door Access Controller Model MKC-1 only.

The DAC Port is provided via the OEM3 (VPS/NPS) Port. If used with a VPS/NPS, customer must provide a "Y" cable to allow both the Door Access Controller and VPS/NPS to be connected to the LMS1000 OEM3 Port.

Recommended to use a Desarrollos Digitales Isolation Board (Model DTP-1-485 / 96-DC24-T, E) between the DAC and LMS1000.

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order List 80 as required.

List 82: PCU/Rectifier Sequencing Software Option

Features

- ◆ Provides PCU/Rectifier Sequential Start.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Besides the sequencing software option, LMS1000 requires dedicated binary (VPS/NPS and traditional rectifiers) and relay (traditional rectifiers only) inputs/outputs to manage the power plant. See the Wiring section of the Installation Instructions (Section 5879).

The LMS1000 Sequencing feature is not for use in 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order List 82 if PCU/Rectifier Sequencing is required.
- 2) Order a binary circuit card if spare inputs are not available for a Commercial AC Fail/Transfer Detection input and a Standby On/Proper Operate Detection input. (Binary channel 9011 'All AC Off' may be used as the Commercial AC Fail/Transfer Detection input in a VPS/NPS Power System).

- 3) Order analog, binary, and relay circuit cards as required when used with 'traditional rectifiers'.

List 83: Energy Management Software Option

Features

- ◆ Provides PCU/Rectifier Energy Management
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Besides the energy management software option, LMS1000 requires dedicated analog, binary, and relay (traditional rectifiers only) inputs/outputs to manage the power plant. See the Wiring section of the Installation Instructions (Section 5879).

The LMS1000 Energy Management feature is not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order List 83 if PCU/Rectifier Energy Management is required.
- 2) Order analog, binary, and relay circuit cards as required when used with 'traditional rectifiers'.

List 84: External GPS Modem Interface

Features

- ◆ Provides access to the LMS1000 via an external GPS Modem.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Interfaces to an Enfora GPS External Modem only.

External Modem Port is provided via the LMS1000 OEM2 Port. CANNOT be used if List [60](#), [61](#), [62](#), or [63](#) ordered.

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order List 84 as required.

List 85: AC Analyzer Interface

Features

- ◆ LMS1000 reads and records values from the AC Analyzer.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

Interfaces to a Dossena AC Analyzer Model MV3DL only.

AC Analyzer Port is provided via the LMS1000 OEM1 Port. CANNOT be used if [List 79](#), [List 86](#), or [List 88](#) ordered.

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order List 85 as required.

List 86: TL1/X.25 Software Option

Features

- ◆ Provides a TL1/X.25 Interface and RS-232 Port with PAD support.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

TL1/X.25 Port is provided via the LMS1000 OEM1 Port. CANNOT be used if [List 79](#), [List 85](#), [List 88](#), or [List 90](#) ordered.

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order List 86 if TL1/X.25 is required (see also [List 90](#) for another TL1 option).

List 87: Power Metering Software Option

Features

- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

This option must be factory installed, or field installed by Emerson Network Power only. This option can be field installed remotely via dial-up phone lines if your LMS1000 is equipped with a modem or via Ethernet if connected to a TCP/IP network.

Ordering Notes

- 1) Order List 87 if Power Metering is required.
- 2) Order a [List 20](#) analog circuit card. This analog circuit card provides 4 analog inputs. One will be connected to system voltage. This leaves three for measuring customer loads. Order one additional analog circuit card per four additional customer loads to be monitored. Note that there is also an 8-input analog circuit card ([List 22](#)) available which monitors up to eight 50 mv shunts.
- 3) Also order one (1) in-line fuse kit to protect the analog leads connected to system voltage. Specify List [BE](#) (3/8" ring lug), List [BF](#) (5/16" ring lug), or P/N [535135](#) (1/4" ring lug, 3/8" ring lug, or butt splice).
- 4) And order a current limit resistor kit for each customer load to be monitored for power consumption. Specify List [BA](#) (3/8" ring lug), List [BB](#) (splice), or List [BC](#) (ring lug for #10 stud)

List 88: Local Port Redirection to OEM 1 Port Option

Features

- ◆ Local communications access is provided via the rear OEM 1 port instead of the front panel port.

Restrictions

The local port is redirected to the LMS1000 OEM1 Port. CANNOT be used if [List 79](#), [List 85](#), or [List 86](#) ordered.

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order List 88 if the local port is required to be on the rear of the cabinet instead of on the front.

List 90: TL1 (over Ethernet) Software Option

Features

- ◆ With the TL1 (over Ethernet) software option, LMS1000 supports TL1 interface in a TCP/IP network. An Ethernet port is provided for this network connection.
- ◆ Refer to the "[Specifications](#)" section of this document for further information.

Restrictions

CANNOT be used if [List 86](#) is ordered.

Ordering Notes

- 1) Order List 90 if TL1 (over Ethernet) is required (see also List 86 for another TL1 option).

List 92: MCA Interface Cable, Customer Specified Length

Features

- ◆ A category 5, four twisted pair conductor, 24 AWG solid copper cable.
- ◆ Cable connects between the MCA of a Vortex Power System (VPS) or NETSURE Power System (NPS) and the 586505000/586505500 Main Cabinet.
- ◆ Customer specified length cable.
- ◆ See also [List 94](#).

Restrictions

Must be assemble by the customer.

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order multiple List 92 as required. Each List 92 provides 5 feet of cable. When ordering multiple List 92, cable is provided uncut.
- 2) Order cable termination kit per [List 93](#).

List 93: MCA Interface Cable Termination Kit

Features

- ◆ Consists of one RJ-45 plug, one 9-pin male D-type plug, four snap-in crimp type contacts, and one cable clamp assembly kit.
- ◆ See also [List 94](#).

Restrictions

Must be assembled by the customer.

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order one (1) List 93 if cable ordered per List 92.
- 2) Order cable per [List 92](#).

List 94: MCA Interface Cable, Pre-assembled

Features

- ◆ Cable connects between the MCA of a Vortex Power System (VPS) or NETSURE Power System (NPS) and the 586505000/586505500 Main Cabinet.
- ◆ 6' long pre-assembled cable.
- ◆ See also Lists [92](#) and [93](#).

Restrictions

Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

Ordering Notes

- 1) Order one (1) List 94 (a six-foot cable terminated at one end with an RJ-45 plug, and at the other end with a 9-pin male D-type plug). **Note:** Another cable option would be P/N 500819 which is a 1.75' cable terminated at one end with an RJ-45 plug, and at the other end with a 9-pin male D-type plug.

List BA: Current Limit Resistor Kit

Features

- ◆ Provides one (1) 49.9 Ohm resistor pigtail assembly with a 3/8" ring lug.
- ◆ Used to protect analog inputs as described under [List 20](#) and [List 22](#) description.
- ◆ Can also be used to protect binary inputs as described under List [30](#) and [31](#) description.

Ordering Notes

- 1) Order as required.

List BB: Current Limit Resistor Kit

Features

- ◆ Provides one (1) 49.9 Ohm resistor pigtail assembly with a splice connection.
- ◆ Used to protect analog inputs as described under [List 20](#) and [List 22](#) description.
- ◆ Can also be used to protect binary inputs as described under List [30](#) and [31](#) description.

Ordering Notes

- 1) Order as required.

List BC: Current Limit Resistor Kit

Features

- ◆ Provides one (1) 49.9 Ohm resistor pigtail assembly with 5/16" ring lug.
- ◆ Used to protect analog inputs as described under [List 20](#) and [List 22](#) description.

- ◆ Can also be used to protect binary inputs as described under List [30](#) and [31](#) description.

Ordering Notes

- 1) Order as required.

List BE: In-Line Fuse Kit

Features

- ◆ Provides one (1) in-line fuse (1A) pigtail assembly with a 3/8" ring lug.
- ◆ Used to protect analog inputs as described under [List 20](#) and [List 23](#) description.

Ordering Notes

- 1) Order as required.

List BF: In-Line Fuse Kit

Features

- ◆ Provides one (1) in-line fuse (1A) pigtail assembly with a 5/16" ring lug.
- ◆ Used to protect analog inputs as described under the [List 20](#) and [List 23](#) descriptions.

Ordering Notes

- 1) Order as required.

List ST: Temperature Sensor

Features

- ◆ Provides one (1) temperature probe to be used with the [List 21](#) temperature input circuit card.
- ◆ Mounts to a 5/16 or M8 stud.

Restrictions

LMS1000 Temperature Probe Wire Specifications:

- **Preferred** wire is P/N 1562077, 18 Ga. solid twisted pair, maximum length is 200 feet.
- **Optional** wire is P/N 1562001, 20 Ga. shielded twisted pair (shield grounded at one end), maximum length is 100 feet.

Ordering Notes

- 1) Order List ST as required.

List SU: Temperature Sensor

Features

- ◆ Provides one (1) temperature probe to be used with the [List 21](#) temperature input circuit card.
- ◆ Mounts to a 1/4 or M6 stud.

Restrictions

LMS1000 Temperature Probe Wire Specifications:

- **Preferred** wire is P/N 1562077, 18 Ga. solid twisted pair, maximum length is 200 feet.

[Home](#)

- **Optional** wire is P/N 1562001, 20 Ga. shielded twisted pair (shield grounded at one end), maximum length is 100 feet.

Ordering Notes

- 1) Order List SU as required.

ACCESSORY DESCRIPTIONS

In-Line Fuse Kit, P/N 535135

Features

- ◆ Provides one (1) in-line fuse (1A) pigtail assembly with a butt splice on one end and the other end unterminated (a butt splice, 1/4" ring lug, and 3/8" ring lug are provided loose to be crimped on the unterminated end as required).
- ◆ Used to protect analog inputs as described under [List 20](#) and [List 23](#) description.

Ordering Notes

- 1) Order P/N 535135 as required.

Replacement CPU Memory Backup Battery

Features

- ◆ The CPU circuit card employs a 3 volt 170 mAH lithium battery which has a shelf life of ten years. Under typical discharge conditions (25 degrees C), the battery can power the memory for about 5000 hours.
- ◆ When the lithium battery reaches approximately 2.5 volts; a local indicator illuminates, the Hardware Failure contacts on the Main CPU card change state, and the firmware generates a Self Diagnostic Error. When this happens it means the lithium battery, under typical conditions, will be able to power the memory for about another ten days.

Restrictions

Emerson Network Power recommends that the memory backup battery be replaced once a year.

Ordering Notes

- 1) Order Part No. 241163100.

LMS1000 Network Cables

Features

- ◆ Cables to connect the 586505000/586505500 Main Cabinet, 586505000/586505500 Expansion Cabinets, and 586505000/586505500 Expansion Assemblies into the LMS1000 Network.

Restrictions

In Spec. Nos. 582140000, 582140001, and 582126100 Power Systems; order cable options per SAG582140000, or SAG582140001, or SAG582126100.

Ordering Notes

- 1) Cable options include a standard length cable as specified in a), or a customer specified length of cable as specified in b). The customer must assemble the cable specified in b).
 - a) **Standard Length Cable:**
Part No. 421842700, a 6 foot long cable terminated at both ends with an RJ-45 plug.
Part No. 509900, a 4 foot long cable terminated at both ends with an RJ-45 plug.
 - b) **Cable Only:** Part No. 156202100, a category 5, four twisted pair conductor, 24 AWG solid copper cable. Specify length in 5 feet increments (cable is provided uncut). Also order termination kit specified in c).

c) **Cable Termination Kit:** Part No. 483589500, consists of two RJ-45 plugs.

130VDC Monitoring Wire Harness

Features

- ◆ Cable harness to monitor 130VDC inputs via the LMS1000 List 20 Four (4) Input analog card providing a SELV input of 0-50mVDC.

Restrictions

Requires available input on a List 20 Four (4) Input analog card per measurement.

Ordering Notes

- 1) Order one (1) P/N 520839 130VDC Monitoring Wire Harness per 130VDC input to be monitored, as required.

SPECIFICATIONS

1. 586505000/586505500 LMS1000 SYSTEM

1.1 Environmental Ratings

- 1.1.1 Operating Ambient Temperature Range:** -40°C to +60°C (-40°F to +140°F).
- 1.1.2 Storage Temperature Range:** -40°C to +85°C (-40°F to +185°F).
- 1.1.3 Humidity:** This system is capable of operating in an ambient relative humidity range of 0% to 95%, noncondensing.
- 1.1.4 Altitude:** The maximum operating ambient temperature should be derated by 10°C at an elevation of 10,000 feet above sea level. For elevations between 3,000 feet and 10,000 feet, derate the maximum operating ambient temperature linearly.
- 1.1.5 Safety Compliance:**
 - (A) This unit is UL Recognized to the requirements of UL 1950, Standard for Information Technology Equipment, for use in Telephone, Electronic Data Processing or Information Processing Equipment.
 - (B) This unit meets the requirements of CSA 22.2, No. 950 and is tested and Certified by UL ("c UR") for use in Telephone, Electronic Data Processing or Information Processing Equipment.

1.2 Firmware Specifications

Note: *If connected to an MCA, the MCA Interface provides additional analog and binary channels. These channels are dedicated to monitor predetermined MCA parameters.*

- 1.2.1** The unit supports a maximum of one (1) user logged in at a time per method of access (i.e. local port, modem port, Ethernet port, SNMP port, TL1/X.25 port, TL1 [over Ethernet] port).
 - (A) The unit supports fixed IP addresses and does not support the DHCP protocol.
 - (B) The unit supports a single TELNET session.
 - 1.2.2 Users:** 8, maximum.
 - 1.2.3 Analog Channels:** 700, maximum, and MCA interface channels.
 - 1.2.4 Binary Channels:** 700, maximum, and MCA interface channels.
 - 1.2.5 Function Channels:** 64, maximum.
 - 1.2.6 Relay Channels:** 100, maximum.
 - 1.2.7 LED Channels:** 8, maximum.
 - 1.2.8 Energy Management Channels:** 80, maximum.
 - 1.2.9 Groups of Channels:** 8, maximum.
 - 1.2.10 Information Pages:** 3, maximum.
 - 1.2.11 Status Pages:** 16, maximum.
 - 1.2.12 Programmable Commands:** 8, maximum.
- #### 1.3 Node Specifications
- 1.3.1 Maximum Number of Nodes Supported:** 25.
 - 1.3.2 Maximum Length of Node Cabling:**
 - (A) **Node-to-Node:** 250 Meters.

(B) Total Wire Length of All Node-to-Node Segments: 450 Meters (1476 Feet).

This is the maximum length of the entire LMS100 Network, and is calculated by adding up the length of every network cable used to interconnect the Main Cabinet, Expansion Cabinets, and Expansion Assemblies. Refer to the Installation Instructions (Section 5879) for cable assembly instructions.

1.4 Software Features

- 1.4.1 User Interface:** Users can interface with LMS1000 through the local port using a local terminal, through a modem (if optional modem installed), through the Ethernet port via a TELNET session, through the Ethernet port using a MIB browser, or through the Ethernet port over the Internet via a WEB Browser.

The local port default parameters are 8 data bits, 1 stop bit, and no parity. These defaults cannot be changed. The data rate of the local port is software selectable from 110 to 19200 bits/s. The data rate is factory set to 19200 bits/s.

The modem port default parameters are 8 data bits, 1 stop bit, and no parity. These defaults cannot be changed. When answering, the data rate of the internal modem switches to match the incoming call. When reporting, the modem data rate will be set to the speed that is programmed in the user configuration of the user being called. When the modem performs a callback, it will call at the speed it answered at.

A user can also interface with LMS1000 via a Telnet session. The LMS1000 presently supports only one Telnet session at a time. To support a Telnet session or MIB browser access, the unit's IP address must be set using the IP command.

- 1.4.2 Security:** When a user logs onto the system, the user is prompted to enter a "User Password".

User configurations provide a "User Access Level" which can be used to limit the commands available to a particular user through the local and remote ports.

The SNMP feature does not support multiple access levels.

Added security for Ethernet connections is provided via the user configurable Host address list.

- 1.4.3 Unit Identification:** Each LMS1000 can be uniquely identified through a programmable unit name, unit number, system identifier (TL1 option), unit header, and unit pager code.

Each LMS1000 is uniquely identified through a programmable unit TCP/IP address.

- 1.4.4 Alarm Classes:** The alarm class feature allows easier relay and LED programming, and helps classify and identify alarms in system reports and scans. There are eight alarm classes (numbered 1 through 8) available. Individual channel alarms (Analog, Binary, etc.) can be assigned to a particular Alarm Class. This Alarm Class then appears as part of the SCAN, ALARMS, and LOG reports to help identify the type of alarm. Relay control programs can be as simple as R0001 = K2, which means relay channel one will energize when there is an alarm for any channel whose Alarm Class is two.

- 1.4.5 Introduction to Channels:**

(A) Channel Identification (I/O Numbering Scheme): The LMS1000 provides **analog** and **binary** input monitoring points, and extended **relay** contact output points. In addition, local front panel programmable **LEDs** are provided. Each input and output point is directly associated with a channel. Thus there are LMS1000 **analog**, **binary**, **relay**, and **LED** channels. In the LMS100, you can combine two or more analog inputs into one **function** channel, and advance software options provide **energy management** channels. This adds **function** channels and **energy management** channels to the list of channel types in the LMS1000.

In the LMS1000 system; the 586505000/586505500 Main Cabinet or 582140000/582140001/582126100 Primary Bay, the 586505000/586505500 Expansion Cabinets or 582140000/582140001/582126100 Secondary Bays, the 586505000/586505500 Expansion Assemblies, and the MCA Interface are referred to as nodes. A node is a grouping of I/O's in a common assembly, cabinet, or bay.

LMS1000 channels are identified through a type designation (A = analog, B = binary, R = relay, L = LED, F = function, and E = energy management), a Node Number (I/O grouping) prefix, and an input/output number. Remember, a particular channel's type designation and input/output number is identical to that of the input or output associated to it.

- Installed optional LMS1000 I/O circuit cards in the 586505000/586505500 Main Cabinet or 582140000/582140001/582126100 Primary Bay and each 586505000/586505500 Expansion Cabinet or 582140000/582140001/582126100 Secondary Bay are automatically detected by LMS1000 firmware. Inputs and outputs are automatically assigned consecutive numbers (per cabinet or bay) for each type detected, starting with the circuit card of that type installed in the left most position (as viewed from the front). Types are A for analog, B for Binary, and R for relay. Temperature inputs are mapped to analog channels.

The Node Number is a fixed number for the 586505000/586505500 Main Cabinet (Node 00), and includes all I/O's associated to the 586505000/586505500 Main Cabinet. For the 582140000/582140001/582126100, Node 00 is the grouping of LMS1000 I/O cards installed in the Primary Bay. Node 00 also includes the LED, Function, and Energy Management channels. For both 586505000/586505500 and 582140000/582140001/582126100, you assign Node Numbers (21-89) to the groupings of LMS1000 I/O cards installed in 586505000/586505500 Expansion Cabinets and 582140000/582140001/582126100 Secondary Bays during the Initial Start-Up procedure.

- Input numbers for the LMS1000 MCA Interface are pre-assigned (The LMS1000 MCA Interface provides additional analog channels and binary channels. These channels are dedicated to the LMS1000 MCA Interface, and are automatically mapped to monitor predetermined MCA parameters.). The Node Number for the LMS1000 MCA Interface is 90 for all Vortex or NETSURE Power Systems except the Spec. Nos. listed next. The Node Number for the LMS1000 MCA Interface to Spec. Nos. 582140000, 582140001, and 582126100 NETSURE Power Systems is 99.
- Input numbers for the LMS1000 Interface to Spec. Nos. 582140000, 582140001, and 582126100 NETSURE Power System Bays are pre-assigned (The LMS1000 Bay Interface provides additional analog channels and binary channels. These channels are dedicated to the LMS1000 Bay Interface, and are automatically mapped to monitor predetermined parameters.). The Node Number for each Bay is 1 through 20, starting with the Primary Bay.
- The LMS1000 also provides self diagnostic alarms on binary channels B0081 through B0099.

Example: A0001,
A represents an analog input/channel
00 represents the 586505000/586505500 Main Cabinet Node or
582140000/582140001/582126100 Primary Bay LMS1000 I/O Grouping Node
(cannot be changed)
01 represents input/channel #01

Example: A3001,
A represents an analog input/channel
30 represents the 586505000/586505500 Expansion Cabinet Node or

582140000/582140001/582126100 Secondary Bay LMS1000 I/O
Grouping Node set as Node #30 (set when network initially
established)
01 represents input/channel #01

Example: A4001,
A represents an analog input/channel
40 represents the 586505000/586505500 Expansion Assembly Node set as
Node #40 (set when network initially established)
01 represents input/channel #01

Example: A9001,
A represents an analog input/channel
90 represents the VPS/NPS MCA Node (cannot be changed)
01 represents input/channel #01

Example: A9901,
A represents an analog input/channel
99 represents the NPS MCA Node (cannot be changed)
01 represents input/channel #01

Example: A0101,
A represents an analog input/channel
01 represents the 582140000/582140001/582126100 Primary Bay Node (cannot
be changed)
01 represents input/channel #01

Example: A0201,
A represents an analog input/channel
02 represents an 582140000/582140001/582126100 Secondary Bay Node
(cannot be changed)
01 represents input/channel #01

(B) Channel Configurations: Each channel has certain attributes that are used by the system in the various software features it provides. These attributes are presented to the user in the channel configurations which allow the user to enter specific information pertaining to these attributes.

(1) Analog Channels: These channels monitor a variety of DC voltages or temperatures. Additionally, with external interfaces, these channels can monitor other signals such as AC voltages, current, and oil pressure. Each of the analog channels has four adjustable alarm limits that can be programmed to report an alarm condition, or record this condition for statistical purposes. Alarms can be distinguished as low or high alarms, and an "Alarm Polarity" attribute can be set to further define the alarm.

Note: Channels of the eight input temperature circuit card are assigned as Analog Channels in the system configuration. These inputs can be set to display in Celsius (default) or Fahrenheit.

- **Analog Channel Alarm Polarity Attribute:** Allows for a more intuitive use of Alarm Limits when used with plant voltage and battery shunts that typically provide a bipolar or negative analog input reading.
 - a) **Default Mode:** High alarm occurs when the reading is greater than the high limit; low alarm occurs when the reading is less than the low limit.
 - b) **Polarized Mode:** A high or low alarm can only occur if the polarity of the alarm matches the polarity of the reading. This is useful for detecting both high charge and discharge currents on a battery shunt. For example, assume a shunt is wired for a negative float current reading, and it has a high

alarm limit of -6.0 amps to detect a high float current. It can then also have a high limit of +100.0 amps to detect a high discharge current. So, in this example there are two high alarms, with opposite polarity.

- c) **Negative Mode:** In the negative mode, the alarm processing is reversed from the default behavior. In other words, a high alarm occurs when the reading is less than the high limit, and a low alarm occurs when the reading is the greater than low limit. This is intended for inputs when the reading is always negative, such as plant voltage, making it possible to have conventional alarm limits. For example, -56.0V can be a high limit (given a float voltage of -54.0V).
- (2) **Binary Channels:** Typical binary inputs include alarm and status indications, and any input with an on and off state. Each of the binary channels can be programmed to report an alarm condition, or record this condition for statistical purposes.
- (3) **Energy Management Channels:** See description of Energy Management channels under "Software Options" found later in this document.
- (4) **Function Channels:** Two or more constants, analog channels, and/or function channels can be programmed into a single function channel. Examples are using the data from various analog channels to obtain load sums and averages, or multiplying two channels together to obtain a power value. Each of the function channels has four adjustable alarm limits that can be programmed to report an alarm condition, or record this condition for statistical purposes.
- (5) **LED Channels:** Eight programmable status LED indicators are provided on the front of the Main CPU card. These LEDs can be programmed to illuminate red, green, or amber (via the LED channels) at specific events or occurrences.
- (6) **Relay Channels:** Each relay channel can be programmed to activate or deactivate the associated relay at a specific event or occurrence, or to be associated to an energy management channel when the energy management and/or sequencing option is ordered.

Note: *Relay channels are not required when the energy management and/or sequencing option is used to control VPS/NPS PCUs.*

- 1.4.6 **Groups:** The group feature permits organizing analog, binary, function, LED, relay, and energy management channels together under one common name as a group. Each group is programmed with a unique name, and may contain any or all channels. This feature enables the user to extract information concerning the group, such as alarm reports and statistics, by using the group name or number instead of each individual channel name.
- 1.4.7 **Alarm Reporting:** The system can be programmed to activate an alarm when the monitored activity connected to any input (or the value of a mathematical expression between various inputs) increases or decreases past a predetermined level, or when any relay or status LED indicator associated with the system energizes or illuminates. When an alarm condition occurs on an input (analog, binary, or function channel), the system can be programmed to notify the user through local visual indicators, extended alarm relay contacts, remote terminal, pager, Email, and/or TL1 network (when TL1 option is ordered). Remote terminal, pager, Email, and/or TL1 network (when TL1 option is ordered) notification of an alarm condition is also available if an alarm condition occurs on an output (relay or LED channel). All system alarms are reported via the SNMP interface.

There are two types of alarm reporting mechanisms available for remote terminal, pager, or Email notification; SYSTEM ALARM REPORTING and INDIVIDUAL USER ALARM REPORTING. System Alarm Reporting has priority over Individual User Alarm Reporting. The system has an automatic log-off feature. This feature will automatically log off a user who is communicating remotely with the system via modem, if the system needs to issue an alarm

report to that or another remote terminal via the modem.

In addition to System Alarm Reporting and Individual User Alarm Reporting, TL1 Report Messages are issued via the LMS1000 TL1 port when the TL1 software option is installed. The automatic log-off feature mentioned above is automatically disabled for the TL1 port. See the description of the TL1 software option.

See also the description of the SNMP software feature for its alarm reporting mechanisms.

- 1.4.8 System Alarm Reporting:** This method is designed to satisfy the requirements of maintenance personnel. In this method, the system as a whole is programmed to report alarm conditions to a specific user (or a sequence of users if the primary user cannot be reached) if an alarm occurs on any channel programmed for System Alarm Reporting. When an alarm condition occurs on a channel configured for System Alarm Reporting, the system attempts alarm notification by either dialing the first user in the predetermined calling sequence or by Emailing the first user. If this user is reached, the alarm report is given in the mode (pager, modem, or Email) configured for the specified user. System Alarm Reporting is considered successful when:

- a) the system connects with a modem or an Email notification is sent to a valid Email address,
- or
- b) the user issues an ACKnowledgement after receiving the alarm notification.

One of the above options is selected during initial system programming. If alarm reporting is not successful, the system continues, calling or Emailing the next specified user. If each user is called or Emailed and an alarm report is not successfully issued, the system waits the specified retry time interval and then repeats the process.

- 1.4.9 Individual User Alarm Reports:** This method provides each user with the capability of receiving four different reports, with the first three listed pertaining only to channels that the user has selected. These reports can be delivered by the system to the user through a pager (via modem), remote terminal (via modem), or Email (via Ethernet). These reports are:

- (A) Occurred Alarm Reports:** a report of any new alarms that have occurred on the user's channels.
- (B) Retired Alarm Reports:** a report of any alarms that have cleared on the user's channels.
- (C) Persistent Alarm Reports:** a periodic report of any alarms that still exist on the user's channels.
- (D) Daily Report:** The user specifies a standard system command or one of the programmable commands which is issued as this report. The daily report is given at a specific time each day.

- 1.4.10 Alarm Cut-Off (ACO):** The alarm cut-off feature enables silencing an external alarm by de-energizing the system alarm relay connected to it. All relays configured for alarm cut-off are de-energized by issuing a command. Another command can be issued to cancel alarm cut-off.

This feature operates by masking (preventing) existing analog and binary alarm conditions from affecting a relay's control program. These alarms are considered cancelled and no longer figure into the evaluation of the relay's control program. Any cancelled alarm that clears and then turns in again DOES have the ability to affect a relay's operation.

A relay channel attribute termed the "Cycle Frequency" is designed for use with external alarm circuitry that has its own alarm cut-off. More specifically, this is for applications where an external ACO has silenced an audible alarm but it is desired to have it turn in again after a preset amount of time. The cycle frequency allows energized system relays to temporarily turn off for 15 seconds, thus providing another "open to close" transition to turn in the audible alarm again.

- 1.4.11 Information Pages:** Three user programmable information pages (or screens) can be entered in the system. These information pages can be viewed by any user. These pages can serve as a note pad or location of instructions for users.
- 1.4.12 Status Pages:** Sixteen user programmable status pages (or screens) can be formatted in the system. These pages permit the displaying of scan information derived from separate channels on a single page format. SCAN information includes the present value and alarm status of a channel, plus other pertinent information.
- 1.4.13 Programmable Commands:** Eight user programmable commands can be entered in the system. A programmable command combines up to eight standard commands into a single command which then can be executed by typing the name given to the programmable command.
- 1.4.14 Mail:** Users have the ability to send mail (messages) to other users, or to themselves.
- 1.4.15 Alarm Log:** The system stores a listing of the 500 latest alarms that have occurred.
- 1.4.16 Event Log:** The system stores a listing of the 500 latest events that have occurred.
- 1.4.17 Analog Channel Maximum Load Percentages (Rate Report):** This feature determines how plant (battery and rectifier) capacities and other sizing limits (fuses, circuit breakers, and wire sizes) are faring under actual load conditions. This feature allows the customer to easily determine the maximum load percentage (that has occurred) versus an analog channel alarm limit. This feature divides the maximum peak value of an analog input and the highest hourly average into a designated alarm limit and presents the results as percentages. These percentages inform the customer how close a channel's peak and high hourly average values are in relation to its alarm limit(s).
- 1.4.18 Battery Discharge Timer:** The LMS1000 can record Battery Discharge History. A Binary, LED, or Relay channel must be identified to monitor the "On Battery" condition. Analog or Function channels must be identified to monitor the Plant Voltage and Plant Load. The Battery Discharge Timer feature displays the last 50 recorded discharges in a tabular format. The information displayed includes the duration of the battery discharge, the time and date at which the discharge began, the lowest recorded plant voltage during the discharge, and the average plant load.
- 1.4.19 Battery Thermal Runaway:** In a VPS/NPS, the LMS1000 is capable of overriding system output voltage (controlled by the MCA) to avoid thermal runaway.
- 1.4.20 MCA Interface:** The MCA Interface allows an LMS1000 User to communicate with the MCA located in a Vortex Power System (VPS) or a NETSURE Power System (NPS). This allows a User to monitor, adjust, and control the VPS/NPS via LMS1000. This interface also enables LMS1000 to control the PCUs in the Power System via the features available in LMS1000. One simple cable connection between the LMS1000 and the MCA completes the interconnections required in a VPS/NPS Power System (except Spec. Nos. 582140000, 582140001, and 582126100). The LMS1000 is factory integrated in a Spec. No. 582140000, 582140001, and 582126100 NETSURE Power System and requires no customer interconnection.

The same tasks accomplished via the MCA local interface pad can be done via the LMS1000. This includes alarm monitoring, system voltage/current monitoring, adjustment of system/alarm circuits, setting system configuration, and setting system calibration. In addition, the LMS1000 automatically maps dedicated analog and binary channels to the Power System. This enables existing LMS1000 features (e.g. alarm log, alarm reporting, analog statistics) to be easily used with the Power System. Also, LMS1000 maintains a history of MCA/Power System configuration and events.

The MCA Interface requires an RS-485 circuit card to be installed on the MCA in the Power System (except Spec. Nos. 582140000, 582140001, and 582126100). Spec. Nos.

582140000, 582140001, and 582126100 MCA Interface is factory integrated and does not require additional hardware.

Note: *The MCA interface in a Spec. No. 582140000, 582140001, or 582126100 Power system only supports one (1) MCA "CAN Input/Output" circuit card per bay.*

Each task supported by the MCA Interface is listed below (for VPS and NPS Power Systems other than Spec. Nos. 582140000, 582140001, and 582126100).

Available to all LMS1000 Users via the ALARMS NETSURE Commands

- View Active VPS/NPS System Alarms
- View Active VPS/NPS Subsystem Alarms
- View Active VPS/NPS MCA Alarms
- View Active VPS/NPS Shunt Alarms
- View Active VPS/NPS LVD Alarms

Available to all LMS1000 Users via the SCAN NETSURE Commands

- View VPS/NPS System Status and Alarms...
 - System Output Voltage
 - Total System Output Current
 - Individual System Output Currents (individual shunts)
 - Temperature Probe Values and Alarm Status
 - System Alarms (includes PCU and Temperature Probe alarms)
- View VPS/NPS Subsystem Status and Alarms (if installed)...
 - Subsystem Output Voltage
 - Total Subsystem Output Current
 - Individual Subsystem Output Currents (individual shunts)
 - Subsystem Alarms
- View VPS/NPS PCU Status...
 - Total PCU Current
 - Individual PCU Currents
- View VPS/NPS Battery Status and Alarms (if battery Shunt PODs installed)...
 - Total Battery Current
 - Individual Battery Currents
 - Battery Alarms
- View VPS/NPS MCA Alarms
- View VPS/NPS LVD Alarms

Available to LMS1000 Users with Access to Level 2 Commands via the PRCONFIG NETSURE Commands

- View VPS/NPS Settings...
 - System Float Voltage
 - System Test/Equalize Voltage
 - System High Voltage Alarm #1
 - System High Voltage Alarm #2
 - System Battery On Discharge Alarm
 - System 50% Battery On Discharge Alarm
 - System High Voltage Shutdown
 - System Overcurrent Alarm
 - System Current Limit
 - System Output Voltage Calibration Reading

[Home](#)

- NAG Minutes (Audible Alarm Cutoff Reset Time Period)
- Battery Charge Temperature Compensation Module's Calibration Voltage
- Subsystem High Voltage Alarm (if installed)
- Subsystem Low Voltage Alarm (if installed)
- Subsystem Output Voltage Calibration Reading (if installed)
- Subsystem Overcurrent Alarm (if installed)
- Battery Overcurrent Alarm
- Auto Equalize Multiplier
- Digital Temperature Compensation Slope
- Digital Temperature Compensation Maximum Voltage
- Digital Temperature Compensation Minimum Voltage
- Battery Current Limit
- Relay Test Time
- Test/Equalize Timeout
- Low Voltage Disconnect "Disconnect" (for each installed LVD)
- Low Voltage Disconnect "Reconnect" (for all installed LVDs)
- Temperature Probes Alarms
- View VPS/NPS Equipment Inventory...
 - PCUs
 - System Shunts
 - Subsystem Shunts
 - Battery Shunts
 - LVDs
 - Temperature Probes
 - Vacant PCU Mounting Positions
 - Maximum System Current Capacity
 - System Operating Mode (Float or Equalize [forced, manual, timed, auto])
 - Temperature Compensation Mode (None, Analog, Digital [Highest, Averaged, Probe #1])
 - MCA Customer Text Message (custom name), Spec. No., Serial No., Software Version
 - Each PCU Customer Text Message (custom name), Spec. No., Serial No.,
Output Voltage Rating, Current Rating

Available to Indicated LMS1000 Users via the SET NETSURE Commands

LMS1000 Users with Access to Level 4 Commands

- Set VPS/NPS NAG Minutes (Audible Alarm Cutoff Reset Time Period)

LMS1000 Users with Access to Level 5 Commands

- Set VPS/NPS System High Voltage Alarm #1 Setting
- Set VPS/NPS System High Voltage Alarm #2 Setting
- Set VPS/NPS System Battery On Discharge Alarm Setting
- Set VPS/NPS System 50% Battery On Discharge Alarm (Voltage is Very Low Alarm) Setting
- Set VPS/NPS System Overcurrent Alarm Setting
- Set VPS/NPS Subsystem High Voltage Alarm Setting (if installed)
- Set VPS/NPS Subsystem Low Voltage Alarm Setting (if installed)
- Set VPS/NPS Subsystem Overcurrent Alarm Setting (if installed)
- Set VPS/NPS Relay Test Time
- Set VPS/NPS Temperature Probe Alarms
- Set VPS/NPS Auto Equalize Multiplier

LMS1000 Users with Access to Level 6 Commands

- Set VPS/NPS MCA Remote Access Password
- Set VPS/NPS System Operating Mode (Float or Test/Equalize)
- Set VPS/NPS System Output Voltage Calibration Reading
- Set VPS/NPS Subsystem Output Voltage Calibration Reading (if installed)
- Reset VPS/NPS System Output Voltage Calibration Reading to Factory Default
- Reset VPS/NPS Subsystem Output Voltage Calibration Reading to Factory Default (if installed))
- Set VPS/NPS Analog Battery Charge Temperature Compensation Module's Calibration Voltage
- Set VPS/NPS Number of 25A, 50A, 100A, and 200A PCU Mounting Positions Available in the System (also custom PCU sizes can be set)
- Reset VPS/NPS Inventory to Reflect Current System Configuration
- Set VPS/NPS System Float Voltage Setting
- Set VPS/NPS System Test/Equalize Voltage Setting
- Set VPS/NPS System High Voltage Shutdown Setting
- Set VPS/NPS System Current Limit Setting
- Set VPS/NPS Low Voltage Disconnect "Disconnect" Settings for all Installed LVDs
- Set VPS/NPS Low Voltage Disconnect "Reconnect" Setting
- Manually Reconnect a Specified LVD.
- Set VPS/NPS PCU Fan Speed (fast, slow)
- Set VPS/NPS PCU Load Share Alarm (on, off)
- Set VPS/NPS PCU State (on, off)
- Set VPS/NPS Digital Battery Charge Temperature Compensation Source (Highest, Averaged, Probe #1)
- Set VPS/NPS Battery Overcurrent Alarm Setting
- Set VPS/NPS Digital Battery Charge Temperature Compensation (Slope, Min. Voltage, Max. Voltage)
- Set VPS/NPS Battery Current Limit
- Set VPS/NPS Test/Eq Timeout
- Set VPS/NPS Individual PCU Custom Text Messages
- Set VPS/NPS Custom Text Message for MCA
- Set VPS/NPS Interface (on, off)

Available to LMS1000 Users with Access to Level 6 Commands via the DOWNLOAD NETSURE , DOWNLOAD TFTP NETSURE , UPLOAD NETSURE , and UPLOAD TFTP NETSURE Commands, respectively

- Download the Configuration of the VPS/NPS to an ASCII File
- Upload a Previously Downloaded Configuration to the VPS/NPS

Each task supported by the MCA Interface is listed below for NPS Power Systems Spec. Nos. 582140000, 582140001, and 582126100.

Available to LMS1000 Users with Access to Level 2 Commands via the PRCONFIG NPS Commands

- View NPS System Float Voltage Setting

[Home](#)

- View NPS System Test/Equalize Voltage Setting
- View NPS System High Voltage Shutdown Setting
- View NPS System Current Limit Setting
- View NPS System High Voltage Alarm #1 Setting
- View NPS System High Voltage Alarm #2 Setting
- View NPS System Battery On Discharge Alarm Setting
- View NPS System Voltage is Very Low Alarm Setting
- View NPS System Total Load Current Alarm Setting
- View NPS System Group A Load Current Alarm Setting
- View NPS System Group B Load Current Alarm Setting
- View NPS System High Temperature Alarm #1 Setting
- View NPS System High Temperature Alarm #2 Setting
- View NPS System Low Temperature Alarm #1 Setting
- View NPS System Low Temperature Alarm #2 Setting
- View NPS NAG Minutes (Audible Alarm Cutoff Reset Time Period) Setting
- View NPS Manual Test/Equalize Time Setting
- View NPS Relay Test Time Setting
- View NPS Auto Equalize Time Multiplier Setting
- View NPS Temperature Compensation Slope Setting
- View NPS Temperature Compensation Maximum Voltage Setting
- View NPS Temperature Compensation Minimum Voltage Setting
- View NPS Inventory

Available to Indicated LMS1000 Users via the SET NPS Commands

LMS1000 Users with Access to Level 4 Commands

- Set NPS NAG Minutes (Audible Alarm Cutoff Reset Time Period)

LMS1000 Users with Access to Level 5 Commands

- Set NPS System Battery On Discharge Alarm Setting
- Set NPS System Voltage is Very Low Alarm Setting
- Set NPS System High Voltage Alarm #1 Setting
- Set NPS System High Voltage Alarm #2 Setting
- Set NPS System Total Load Current Alarm Setting
- Set NPS System Group A Load Current Alarm Setting
- Set NPS System Group B Load Current Alarm Setting
- Set NPS Relay Test Time Setting
- Set NPS System High Temperature Alarm #1 Setting
- Set NPS System High Temperature Alarm #2 Setting
- Set NPS System Low Temperature Alarm #1 Setting
- Set NPS System Low Temperature Alarm #2 Setting
- Set NPS System Power Share Capacity Setting

LMS1000 Users with Access to Level 6 Commands

- Set NPS System Operating Mode (Float or Test/Equalize)
- Turn any Installed NPS PCU On or Off (TR Feature)
- Set NPS MCA Remote Access Password
- Set Custom Text Messages for NPS Elements
- Set NPS System Float Voltage Setting
- Set NPS System Test/Equalize Voltage Setting
- Set NPS System High Voltage Shutdown Setting
- Set NPS System Current Limit Setting
- Perform a Relay Test
- Set NPS Manual Test/Equalize Time Setting
- Set NPS Auto Equalize Time Multiplier Setting
- Set NPS Temperature Readings to Celsius
- Set NPS Temperature Readings to Fahrenheit
- Set NPS Temperature Compensation Slope Setting
- Set NPS Temperature Compensation Maximum Voltage Setting
- Set NPS Temperature Compensation Minimum Voltage Setting
- Reset NPS Inventory to Reflect Current System Configuration
- Set the following parameters for NPS MCA CAN I/O circuit cards
 - Designate Analog Input as "Auxiliary" or "Distribution"
 - Set the Scale Factor for Analog Input and Output
 - Designate the Alarm State for Binary Inputs
 - Set Custom Text Messages (Names)
 - Enable or disable NPS System Alternate Current Limit operation
 - Set NPS System Alternate Current Limit Capacity setting
 - Set NPS System Sequencing Delay setting

Available to LMS1000 Users with Access to Level 6 Commands via the DOWNLOAD NPS, DOWNLOAD TFTP NPS, UPLOAD NPS, and UPLOAD TFTP NPS Commands, respectively

- Download the Configuration of the NPS to an ASCII File
- Upload a Previously Downloaded Configuration to the NPS

1.4.21 IP Parameters

- (A) The system "IP" address can be set.
- (B) The "Gateway Address" can be set and listed.
- (C) The "Netmask Address" can be set and listed.

1.5 Standard Software Features

1.5.1 WEB Interface Software Feature

- Allows you to access the LMS1000 over the Internet via a WEB Browser.
- Read access only for security.
- Displays LMS1000 status in a simple three-pane WEB Interface.

- Top pane for LMS1000 identification, alarm notification, and display of system voltage and system current that updates approximately every 15 seconds.
- Left pane for navigation.
- Right pane for display of status information, which includes display of...

Alarms and Logs

Alarm Status (equivalent of the LMS1000 ALARMS command)

Alarm Log (equivalent of the LMS1000 LOG command)

Event Log (equivalent of the LMS1000 EVENTS command)

Equipment

Hardware (equivalent of the LMS1000 BOARDS command)

- You can configure your own LMS1000 WEB Pages to display. The following User defined LMS1000 features can be displayed in the WEB Browser...

LMS1000 Status Pages

LMS1000 Channel Groups

LMS1000 User Channels

- Requires Netscape Navigator (v4.0 or later) or Microsoft Internet Explorer (v4.0 or later).

1.5.2 SNMP Software Feature: LMS1000 supports SNMP (Simple Network Management Protocol) interface in a TCP/IP network. Communications to and from LMS1000 is accomplished via a MIB (Management Information Base) browser. An Ethernet port is provided for this network connection.

(A) SNMP Alarm Reporting via the Ethernet Port: All system alarms are reported via the SNMP interface. Alarms sent via SNMP traps can be configured for three different types. These are ...

(1) TRAPS OCCURRED, selects reporting of new system alarms that have occurred.

(2) TRAPS RETIRED, selects reporting of system alarms that have cleared.

(3) TRAPS PERSISTENT, selects periodic reporting of system alarms that still exist. The **Persistent Alarm Period** specifies how frequently the system will attempt a Persistent Alarm Report.

(B) SNMP Parameters:

(1) The "Get" community string can be set and listed.

(2) The "Set" community string can be set and listed.

(3) "Trap Addresses" can be added, deleted, and listed. SNMP V1 or V2 traps can be received. The SNMP version of the traps sent are selected through software (V1 or V2).

(4) "Host Addresses" can be added, deleted, and listed.

(5) "Trap Addresses" can be enabled and disabled.

1.6 Available Software Options

1.6.1 Gateway Port Software Option (if installed): The Gateway Software Option allows the LMS1000 to emulate a "dumb" RS-232 asynchronous terminal interface. When installed, user input through either a local or remote LMS1000 port is directed to the customer equipment connected to the LMS1000 Gateway port.

Restrictions

- Only one LMS1000 Gateway port supported.
Only one Gateway port User at a time supported.
- **Gateway Port:** In the 586505000/586505500 system, the Gateway port is provided via the LMS1000 OEM1 port. In the 582140000/582140001/582126100 system, the Gateway port is provided via the port located on the front of the LMS1000 CPU circuit card installed in the Primary Bay.
- **Session Abort Control:** A Gateway session must be manually terminated using the special Gateway session termination escape sequence. The LMS1000 will not detect an abort of the Gateway session by the device connected to the Gateway port, nor is it capable of terminating the session with the device connected to the Gateway port when the LMS1000 session is aborted abruptly.
- **Loss of Carrier:** The LMS1000 will automatically terminate Gateway access established via modem dial up or TELNET in the event of carrier loss.
- **User Timeout:** The Gateway Port is automatically deactivated and the User is returned to the LMS1000 command prompt if the LMS1000 User Timeout Period is exceeded.
- **Alarm Reporting:** When using a dial-up session to communicate with the Gateway port, dial-out alarm notification via LMS1000 is delayed until the Gateway session is terminated and control is returned to the LMS1000.
- With the exception of session inactivity monitoring, any related communications protocol control (i.e., character echoing) will be performed by the device connected to the Gateway port.
- Third party software utilized to communicate with Gateway connected device will need to first logon to the LMS1000 and enter the CONNECT command.

The LMS1000 does not support any third party proprietary communications protocol required to communicate with customer equipment connected to the Gateway port.

- 1.6.2 Power Metering Software Option (if installed):** This option allows accurate metering of power consumed by equipment connected to your power plant. This feature monitors power consumption of up to sixty-four (64) separate pieces of equipment connected to the power plant. Power consumption data is generated and stored for any function channel properly configured for power monitoring. Entering the command POWER generates and displays the power consumption report. This report may also be generated in a "comma separated value" format which can easily be imported into a spreadsheet for record keeping or presentation purposes. The user is responsible for translating power consumption data into dollars billed.

To use this feature, an analog channel must monitor system voltage and other analog channels must monitor load current for each equipment to be monitored for power consumption. A function channel must be configured for each equipment to be monitored for power consumption by entering the phrase "KW" for the "Unit Text", and entering the appropriate program line to multiply the value of the analog channel monitoring system voltage with the value of the analog channel monitoring load current, then divide this product by 1000 [i.e. $F01=(A0001*A0002)/1000$]. Instead of dividing by 1000, you could multiply by 0.001 [i.e. $F01=A0001*A0002*0.001$]

To get a report, enter the command POWER. Any time the POWER command is entered, LMS1000 generates a power consumption report for the function channels and displays the resulting information. For the "comma separated value" format, enter the command POWER CSV. The POWER command is available to a user programmed for access to level 1 commands.

To clear the Power Metering data, enter the command CLR POWER. The CLR POWER command is available to a user programmed for access to level 4 commands.

- 1.6.3 Energy Management Software Option (if installed):** The optional energy management programming permits an installation to only operate rectifiers/PCUs as needed to maintain the load and keep batteries in a fully charged condition. As load increases, the energy management feature will turn on additional rectifiers/PCUs as needed in 15 second intervals when load requirements exceed a user selectable percent (90-99%) of the total capacity of the operating rectifiers/PCUs to maintain the load. LMS1000 will also turn off rectifiers/PCUs as necessary in 15 minute intervals if the load decreases below a separate user selectable percent of the total capacity of the would be operating rectifiers/PCUs. Rectifiers/PCUs which are always operating to maintain any load requirements are cycled through the group of rectifiers/PCUs controlled by this feature to provide uniform operating times for each rectifier/PCU. This rotation occurs from 1-365 days (at midnight), as selected by the user. The base rectifier/PCU is rotated decrementally through the group. As an example, first rectifier/PCU 5 was on at all times, at the programmed time interval rectifier/PCU 4 is on at all times, and at the next occurrence of the programmed time interval rectifier/PCU 3 will be on at all times. If energy management is used, all rectifiers/PCUs in the system should be controlled.

Energy Management Channels: A maximum of 80 energy management channels can be programmed, thus LMS1000 can support any combination of up to 80 energy managed rectifiers and PCUs. An energy management channel combines two input channels with a single output channel (rectifier only) per rectifier/PCU to accomplish the task of controlling the rectifiers/PCUs for energy management and sequential start purposes.

Note: *The number of rectifiers that can be controlled is limited to 32 due to the availability of 32 relay channels dedicated for energy management/sequential start. PCUs do not require hard wired relay channels for energy management, hence 80 PCUs may be controlled. Any combination of rectifiers and PCUs may be controlled, up to 80 total, as long as rectifiers don't exceed 32.*

Note: *Operation of Energy Management is disabled when the Dual MCA Interface option is installed.*

- 1.6.4 Sequential Start Software Option (if installed):** LMS1000 can support up to 80 sequential start controlled rectifiers/PCUs (see note above). There are two types of optional sequencing available with the sequential start option: commercial AC sequencing and standby sequencing. Commercial AC sequencing permits sequential starting of rectifiers/PCUs assigned to energy management channels when commercial AC input fails and subsequently is restored. When AC power is lost and then resumes, the AC sequencing option turns off all controlled rectifiers/PCUs, and then starts the rectifiers/PCUs sequentially at 15 second intervals until all controlled rectifiers/PCUs are operating. This prevents commercial AC power surges which could cause an overload condition possible when several rectifiers/PCUs are started simultaneously. The standby sequencing option prevents similar surges when rectifiers/PCUs are powered from a backup AC source, such as an engine-alternator, after a failure occurs in the commercial AC source. These surges could stall or overload the standby equipment. LMS1000 senses when the commercial AC input fails and immediately turns off all controlled rectifiers/PCUs. It waits a programmed time interval and, when it senses that the standby equipment is operating properly, then sequences the rectifiers/PCUs on at 15 second intervals until all controlled rectifiers/PCUs are operating. When AC input power resumes, commercial AC sequencing as described above occurs. Once all controlled rectifiers/PCUs are restarted, energy management (if supplied) will resume. Rectifier/PCU sequencing has priority over energy management. Both types of sequencing use binary input changes to initiate the sequencer.

The sequencer can also be configured with a Sequencer Failsafe Timer feature. This feature

aborts sequencer operation when an external monitoring device controlling sequencer operation fails. The timer starts when LMS1000 detects an AC failure. If the timer expires before a signal is received, indicating that the commercial AC is restored or load was transferred to the standby power source, the following occur: The sequencer is disabled, an entry is made in the event log, the sequencer variables are reset, and all rectifiers/PCUs are turned on. If a signal is received before the timer expires, the timer is deactivated and reset. When the sequencer is disabled, the Set Sequence command must be re-issued to re-activate the sequencer.

Note: *Setting the Sequencer Failsafe Timer to zero (0) disables this feature.*

The sequencer can also be configured with an AC Restoration Qualification Timer feature. This feature is only available when the INPUT TYPE attribute of the sequencer is configured as a FAIL type, and not as a TRANSFER type. This feature allows the sequencer to turn all rectifiers/PCUs off and start the sequence re-start operation at a specific time interval from when commercial AC is restored. The timer starts when a signal is received indicating that the commercial AC is restored. The standby sequencer (if configured) operates normally until the timer expires. When the timer expires, all rectifiers/PCUs are turned off and the AC sequencer starts. If AC fails before the timer expires, the timer is deactivated.

Note: *The AC Restoration Qualification Timer feature should be set to a few seconds less than the actual amount of time required for a proper transfer.*

Note: *Setting the AC Restoration Qualification Timer to zero (0) disables this feature.*

1.6.5 TL1/X.25 Software Option (if installed): LMS1000 can operate as a Network Element (NE) in a Network Maintenance and Administration (NMA) system. An NMA is an Operations System (OS) developed by Bell Communications Research (Bellcore).

This software option provides support to the specific TL1 commands and messages listed in the Commands Chapter of the User Instructions (Section 5847). This option also provides an asynchronous RS-232 port connection. The port is designed to provide an interface to a network device which converts the asynchronous output to X.25 packets. The packets can then be sent out across the network to an operations center or user console.

The terms Access Identifier, LMS1000 Access Identifier, and LMS1000 Sub-Access Identifier are described as follows.

Access Identifier: In a Network Maintenance and Administration (NMA) system, a unique access identifier (AID) is used to identify each entity contained within the system. LMS1000 must be configured to allow a single access identifier to be used to access and report on an NMA system entity which may consist of a multiple of sub-entities, each monitored by a variety of LMS1000 channels. This is accomplished by configuring LMS1000 access identifiers and LMS1000 sub-access identifiers as described next. A list of suggested access identifiers and sub-access identifiers appears in TA-NWT-001360, Table 4-1.

LMS1000 can be set to use an "AID delimiter". When enabled, the LMS1000 access identifier field and the LMS1000 sub-access identifier field in all responses to TL1 commands and reports containing a TL1 access identifier field is separated by a hyphen. The use of an "AID delimiter" (a hyphen) can be enabled or disabled, as described in "Setting the TL1/X.25 Port Parameters" of the System Configuration Chapter in the Installation Instructions (Section 5879).

LMS1000 Access Identifier: Thirty-two (32) LMS1000 access identifiers are available. The LMS1000 access identifier is used to uniquely identify a system entity (such as a power plant).

LMS1000 Sub-Access Identifier: The LMS1000 sub-access identifiers are used to uniquely identify each sub-entity of an entity (such as each rectifier, each battery string, etc. contained in a power plant).

The association between all LMS1000 channels monitoring an individual rectifier, an individual

battery string, etc. is made by configuring each channel monitoring this individual sub-entity with a unique sub-access identifier name. This is done when the individual LMS1000 channels are configured.

Thus all LMS1000 channels monitoring rectifier one may be configured with the sub-access identifier name RECT1. All LMS1000 channels monitoring rectifier two may be configured with sub-access identifier RECT2. All LMS1000 channels monitoring battery string one may be configured with the sub-access identifier BATSTR1. All LMS1000 channels monitoring battery string two may be configured with sub-access identifier name BATSTR2. Etc.

Now, to associate the sub-entities (each rectifier, each battery string, etc.) to the entity (the power plant), you configure the access identifier to include all LMS1000 channels monitoring this entity and any sub-entity contained within. This is done through the use of the LMS1000 command SET AID.

TL1 Report Messages: When used in a TL1 network, each user is provided with the capability of receiving TL1 report messages pertaining only to channels that the user has selected. These messages are delivered by the LMS1000 to the user via the TL1 port. These messages are:

- (A) Report Alarm Messages:** A Report Alarm message is issued when a user channel configured with the notification code attribute "CR", "MJ", or "MN" alarms or retires.
- (B) Report Event Messages:** A Report Event message is issued when a user channel configured with the notification code attribute "NA" alarms or retires.
- (C) Report Condition Messages:** A Report Condition message is a periodic report on all alarms for user channels configured with the notification code "CR", "MJ", "MN", or "NA" that have not cleared since the last report was issued. If the report condition interval is set to a value of zero, this type of report message is disabled.

1.6.6 TL1 (over Ethernet) Software Option (if installed): Same as TL1/X.25 Software Option (see Paragraph 1.5.5) except TL1 support is provided via the LMS1000 Ethernet port.

1.6.7 LMS Dual MCA Interface Software Option (if installed): This option allows a Spec. No. 582140000, 582140001, and 582126100 NETSURE Power System (NPS) to be integrated with an existing Vortex Power System.

Requires LMS Firmware version 9.0.1.2 or later.

The option allows system control and monitoring functions to be performed through a single controller. System related data parameters from the Vortex system are passed to the NPS controller (MCA). System settings are controlled by the NPS MCA and can be changed either directly at its front panel interface or indirectly with the LMS's 'SET NPS' commands.

Status of the Vortex Power System parameters are still accessible using the Vortex System front panel display or associated LMS commands. Changes in settings not associated to system control can be modified through the LMS's 'SET VORTEX' commands. VPS parameter readings and status are assigned to LMS nodes ninety and ninety-one. Refer to *Accessing a Vortex Power System* in the OPERATION Chapter of the LMS User's Manual (Section 5847) for a list of the specific parameter channel assignments.

System settings can be changed using one of two methods.

- The front panel interface of the NPS main bay. The LMS detects that the setting has been changed on the NPS's front panel and also changes the associated setting of the VPS.
- The LMS's command line interface using the 'Set NPS' commands. The LMS requests the NPS to change the setting and upon verification the associated VPS setting is updated.

The following VPS readings and statuses are communicated to the NPS controller via the LMS-NPS LISP communications link.

- The VPS '*Total PCU Current*' reading (LMS function channel sixty-four program line must be 'F64 = A9005'). The value is summed into NPS *Total PCU Current* parameter reading (associated LMS channel A9902).
- The VPS '*Total System Current*' reading (LMS function channel sixty-three program line must be 'F63 = A9002'). The value is summed into NPS *Total Load Current* parameter reading (associated LMS channel A9903).
- The number of failed VPS PCUs. The NPS uses this to determine the System PCU Major and System PCU Minor alarms.
- The VPS '*Fuse Alarm*' status (LMS LED channel seven program line must be 'L7 = B9010'). The status must be configured in the NPS controller function definition to create an alarm indication.
- The VPS '*AC Fail Alarm*' status (LMS LED channel eight program line must be 'L8 = B9011'). The status must be configured in the NPS controller function definition to create an alarm indication.
- The VPS '*System Major*' and '*System Minor*' (the associated LMS channels (B9015 and B9016) must have the 'Alarm Class' parameter configured for LMS Alarm Class 'MAJOR and MINOR' respectively).

1.7 Specialty Interfaces

1.7.1 Door Access Controller (DAC) Interface: Provides interface to a Door Access Controller via the LMS1000 OEM3 Port.

- The DAC can be configured and monitored via LMS1000.
- Provides dual control of the door latch (LMS1000 and DAC Keypad). Keypad access can be enabled and disabled via LMS1000.
- Provides LMS1000 Binary Channels to monitor DAC Communications, Strike Failure, Forced Entry, Invalid DAC PIN List, and a Door Open Alarm.
- Provides LMS1000 Event Log entries for each valid and invalid Key Codes entered.
- Key codes can be SET, DELETED, LISTED. DAC access via key codes can be enabled and disabled.
- Status of door and electric strike can be viewed.
- An LMS1000 Relay will be used to allow remote control of the Door Latch in the event the DAC fails. The LMS1000 Relay will be controlled via two user configurable LMS1000 commands to open the door and lock the door.

1.7.2 External GPS Modem Interface: Provides interface to an external modem via the LMS1000 OEM2 Port.

1.7.3 AC Analyzer Interface: Provides interface to an AC Analyzer via the LMS1000 OEM1 Port.

- Provides LMS1000 Analog Channels to display the various parameters monitored by the AC Analyzer. Provides an LMS1000 Binary Channel to monitor the communications path to the AC Analyzer.

2. 586505000/586505500 LMS1000 MAIN CABINET

2.1 Input Ratings

2.1.1 Input Voltage Range: 20 - 60 Volts DC.

2.1.2 Maximum Input Current: 0.7 Amperes.

2.2 Mounting

2.2.1 586505000 List 1: Furnished reversible mounting angles permit mounting in a 19" or 23" wide relay rack with 1" or 1-3/4" multiple drilling. **586505000 and 586505500 List 2:** Furnished mounting angles permit mounting in a 23" wide relay rack with 1" or 1-3/4" multiple drilling.

2.2.2 Mounting angles may be re-positioned for flush front mounting, 5-inch front projection mounting, or 6-inch front projection mounting.

2.3 I/O Circuit Card Mounting Positions

2.3.1 Provides for mounting of any combination of I/O (analog, binary, relay, and temperature) circuit cards. CARDS MUST BE LOADED LEFT TO RIGHT (AS VIEWED FROM THE FRONT OF THE CABINET). DO NOT SKIP SLOTS.

2.3.2 Contains ten (10) I/O circuit card mounting slots.

2.4 CPU Circuit Card, Part No. 545476 (used in 586505000/586505500) and 545558 (used in 582140000, 582140001, and 582126100)

2.4.1 General: The CPU circuit card contains the system's firmware, a power supply circuit, communications circuits, and programmable local LED indicators. This circuit card can be equipped with a piggy-back modem circuit card.

2.4.2 Processor: MC 68EN302 - 20MHz.

2.4.3 SRAM - Data: 2M bytes.

2.4.4 Flash - System: 1M bytes.

2.4.5 Flash - Application: 3M bytes.

2.4.6 Real-Time Clock: The time base for the operating system comes from a real time clock. This integrated circuit is totally self-contained and does not require any calibration. Accuracy=10 PPM (27 seconds per month) or better at nominal temperature.

2.4.7 Low Lithium Battery Detection Circuit: Illuminates a local LED indicator for low lithium battery indication.

2.4.8 Communications:

Note: The following ports may be different when the LMS1000 is used in a Spec. No. 582140000, 582140001, or 582126100 Power System. Refer to the 582140000, 582140001, or 582126100 system documentation.

(A) Local Port (RS-232): A front panel 9-pin female D-type jack is provided. This jack is configured as a DCE (Data Communication Equipment). Refer to Table 1 for pin assignments.

Note: When List 88 is ordered, the port on the front of the 586505000/586505500 cabinet is inactive, and the local port is redirected to OEM1 located on the rear of the cabinet. The configuration of the OEM1 port in this application is as shown in Table 2.

(B) Modem Port: An internal 56K bps modem circuit card can be installed onto the CPU circuit card. The modem circuit card connects to an RJ-11 phone jack located on the rear of the system cabinet for customer phone line connection.

(C) Ethernet Port: A rear panel RJ-45 10BaseT jack is provided. This jack has a standard Ethernet pin configuration scheme, twisted pair.

(D) OEM1 Port (RS-232): A 9-pin female D-type jack is provided on the rear panel of the 586505000/586505500 cabinet. This jack is configured as a DTE (Data Terminal Equipment). Refer to Table 2 for pin assignments. The port's function is determined by the LMS1000 Software Options or LMS1000 Specialty Interface Options installed.

- (E) **OEM2 Port (RS-232/RS-422):** A 9-pin female D-type jack is provided on the rear of the 586505000/586505500 cabinet. This jack is configured as a DTE (Data Terminal Equipment). This port is software selectable to provide either an RS-232 or an RS-422 connection. Refer to Tables 3 and 4 for pin assignments. The port's function is determined by the LMS1000 Software Options or LMS1000 Specialty Interface Options installed.
- (F) **OEM3 VPS/NPS Port (RS-485):** A 9-pin female D-type jack is provided on the rear of the 586505000/586505500 cabinet. This jack is used to connect LMS1000 to an MCA located in a Vortex Power System (VPS) or NETSURE power System (NPS). The port's function is also determined by the LMS1000 Software Options or LMS1000 Specialty Interface Options installed. Refer to Table 5 for pin assignments.
- (G) **LMS1000 Network Ports:** Four RJ-45 jacks are provided for interconnecting Expansion Cabinets and Expansion Assemblies into the LMS1000 network. Refer also to Paragraph 1.3 "Node Specifications".

| Port Pin Number | Application | Input/Output |
|-----------------|----------------------------|--------------------|
| 1 | - | - |
| 2 | Transmitted Data (TxD) | Output from System |
| 3 | Received Data (RxD) | Input to System |
| 4 | Data Set Ready (/DSR) | Output from System |
| 5 | Signal Ground (Gnd) | - |
| 6 | Data Terminal Ready (/DTR) | Input to System |
| 7 | Clear to Send (/CTS) | Input to System |
| 8 | Request to Send (/RTS) | Output from System |
| 9 | - | - |

Note: When List 88 is ordered, the port on the front of the cabinet is inactive, and the local port is redirected to OEM1 located on the rear of the cabinet. The configuration of the OEM1 port in this application is as shown in Table 2. List 88 cannot be used in conjunction with List 85 (AC Analyzer Interface) or List 86 (TL1/X.25).

Table 1
Front Panel Local Port (9-Pin Female D-Type Jack) Pin Assignments
RS-232 Configured as DCE

| Port Pin Number | Application | Input/Output |
|-----------------|----------------------------|--------------------|
| 1 | - | - |
| 2 | Received Data (RxD) | Input to System |
| 3 | Transmitted Data (TxD) | Output from System |
| 4 | Data Terminal Ready (/DTR) | Output from System |
| 5 | Signal Ground (Gnd) | - |
| 6 | Data Set Ready (/DSR) | Input to System |
| 7 | Request to Send (/RTS) | Output from System |
| 8 | Clear to Send (/CTS) | Input to System |
| 9 | - | - |

Table 2
OEM1 Port (9-Pin Female D-Type Jack) Pin Assignments
RS-232 Configured as DTE

| Port Pin Number | Application | Input/Output |
|-----------------|----------------------------|--------------------|
| 1 | Data Carrier Detect (/DCD) | Input to System |
| 2 | Received Data (RxD) | Input to System |
| 3 | Transmitted Data (TxD) | Output from System |
| 4 | Data Terminal Ready (/DTR) | Output from System |
| 5 | Signal Ground (Gnd) | - |
| 6 | Data Set Ready (/DSR) | Input to System |
| 7 | Request to Send (/RTS) | Output from System |
| 8 | Clear to Send (/CTS) | Input to System |
| 9 | - | - |

Table 3
OEM2 Port (9-Pin Female D-Type Jack) Pin Assignments
Software Selected for RS-232 Connection, Configured as DTE

| Port Pin Number | Application | Input/Output |
|-----------------|-------------------------|--------------------|
| 1 | Received Data (RxD-) | Input to System |
| 2 | Received Data (RxD+) | Input to System |
| 3 | Transmitted Data (TxD+) | Output from System |
| 4 | Transmitted Data (TxD-) | Output from System |
| 5 | Signal Ground (Gnd) | - |
| 6 | Handshake Out (HSO-) | Output from System |
| 7 | Handshake Out (HSO+) | Output from System |
| 8 | Handshake In (HSI+) | Input to System |
| 9 | Handshake In (HSI-) | Input to System |

Table 4
OEM2 Port (9-Pin Female D-Type Jack) Pin Assignments
Software Selected for RS-422 Connection, Configured as DTE

| Port Pin Number | Application | Input/Output |
|-----------------|------------------------|--------------------|
| 1 | -- | -- |
| 2 | Transmitted Data (TxD) | Output from System |
| 3 | Received Data (RxD) | Input to System |
| 4 | -- | -- |
| 5 | Signal Ground (Gnd) | -- |
| 6 | -- | -- |
| 7 | -- | -- |
| 8 | -- | -- |
| 9 | -- | -- |

Table 5
OEM3 Port (9-Pin Female D-Type Jack) Pin Assignments
RS-485 Configured as DCE

- 2.4.9 Controls and Indicators:** The following controls and indicators are provided on the CPU circuit card. Refer to the Operating Chapter in the User Instructions (Section 5847) for descriptions and locations.
- (A) Eight Programmable LED Indicators: Programmable for illumination event and color (red, amber, or green)
 - (B) One Programmable Switch (can be used in program lines)
 - (C) One CPU Reset Pushbutton Switch
 - (D) One CPU/Hardware Fail LED Indicator
 - (E) One Power On / Low Lithium Battery LED Indicator
- 2.4.10 External CPU/Hardware Fail Alarm Contacts:** A single set of Form-C relay contacts change state when a hardware failure activates one or more of the hardware fail channels. In the LMS1000, these channels are B0081 through B0099. These contacts are rated for 0.6A at 125 VAC, 0.5A at 110 VDC, and 2.0A at 30 VDC.
- 2.4.11 Watchdog Circuit:** A watchdog circuit constantly monitors program execution and issues a system reset if it appears the processor is "lost". If the processor is still not functioning after the first reset, the circuit automatically shuts down the system by performing a permanent system reset. This permanent reset can be cleared by momentarily depressing the CPU RST (reset) pushbutton switch.
- 2.4.12 Memory Backup Battery:** All of the information that is programmed by the customer is stored in RAM memory on the CPU circuit card. When power is removed, the real time clock and RAM memory are backed up by a lithium battery and a .1 farad capacitor. The capacitor actually serves two purposes. First, when the memory and clock are on backup power, the capacitor supplies the load (for about 20 minutes) before the battery takes over. This reduces the drain on the battery which helps lengthen its life. Second, when a battery is removed, the capacitor continues to supply power until the new battery is installed. Thus, the contents of the clock and memory are preserved while the lithium battery is being replaced.
- 2.5 LMS1000 Front Panel Display Option**
- 2.5.1** Provides a front panel vacuum florescent display (VFD) and keypad.
- The VFD is a 4-line, 20-character display.

- The keypad consists of 12 keys; numbers 0 through 9, ENTER, and MENU. The following numeric keys also function as arrow keys: 2 = UP, 8 = DOWN, 4 = LEFT, 6 = RIGHT.

- 2.5.2** Provides read only access to view plant voltage and load current, view active alarms, perform channel scans, view the Events Log and Alarm Log, view channel statistics, and view battery discharge history.
- 2.5.3** Requires LMS1000 firmware version 5.0.0 or later.
- 2.5.4** List 60 and List 62 require I/O card slot #10. List 61 and List 63 use an interconnect harness in lieu of the 10th I/O slot.
- 2.5.5** Not for use in Spec. Nos. 582140000, 582140001, and 582126100 Power Systems.

2.6 Optional Modem Circuit Card, Part No. 508951

- 2.6.1 General:** Provides for remote communications at 56K bps.
- 2.6.2** Compatible with CCITT V.22, Bell 212A, and Bell 103 standards.
- 2.6.3** DTMF and pulse dialing.
- 2.6.4** FCC Part 68 Registered.
- 2.6.5 Theory of Operation**

Refer to Figure 1 for a flow diagram depicting modem operation.

Note: *Additional features (i.e. error control, data compression, etc.) supported by remote modem must be deactivated. Refer to operating manual supplied by modem manufacturer.*

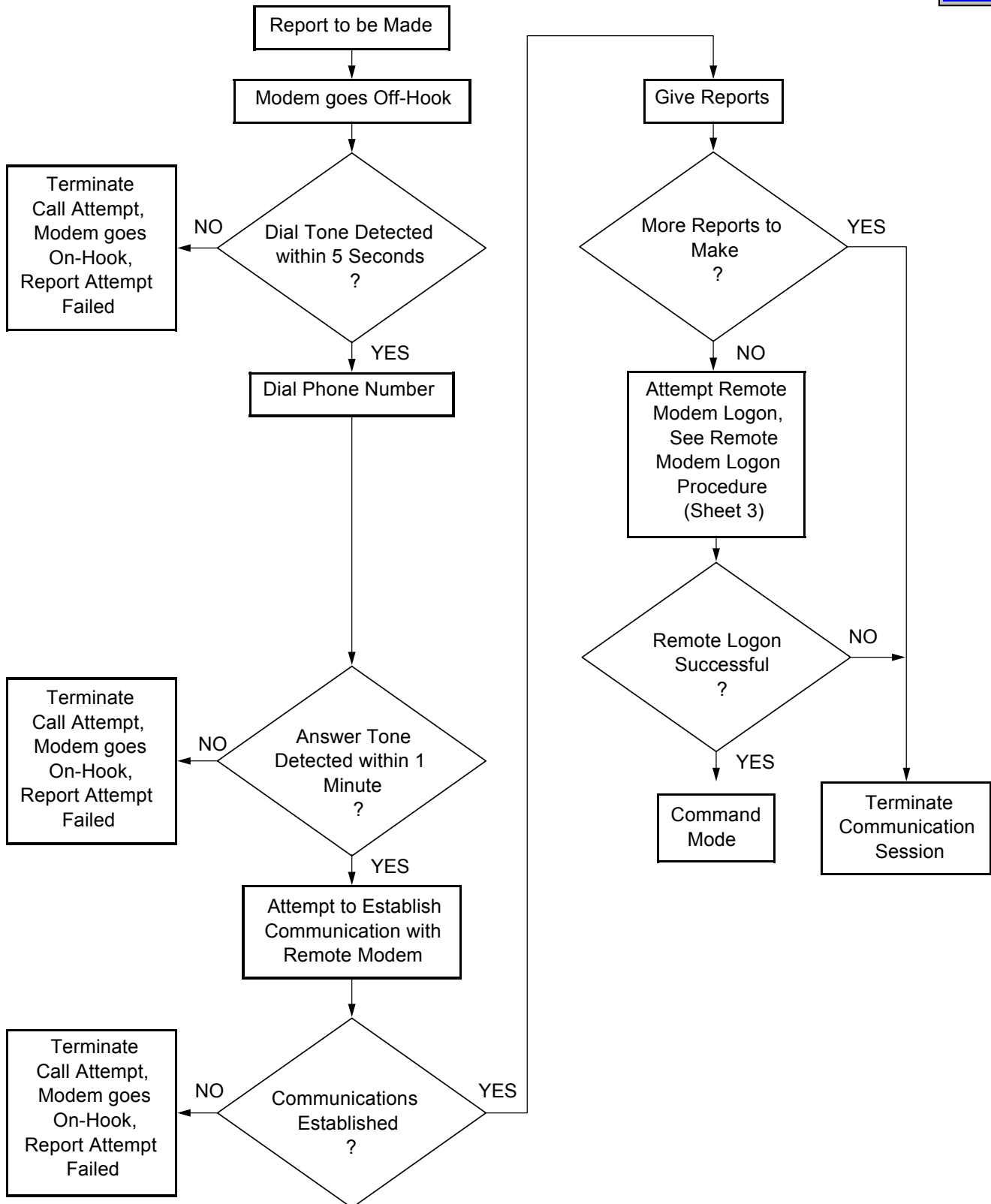


Figure 1 (Sheet 1 of 3)
Modem Operation - Modem Calling Procedure

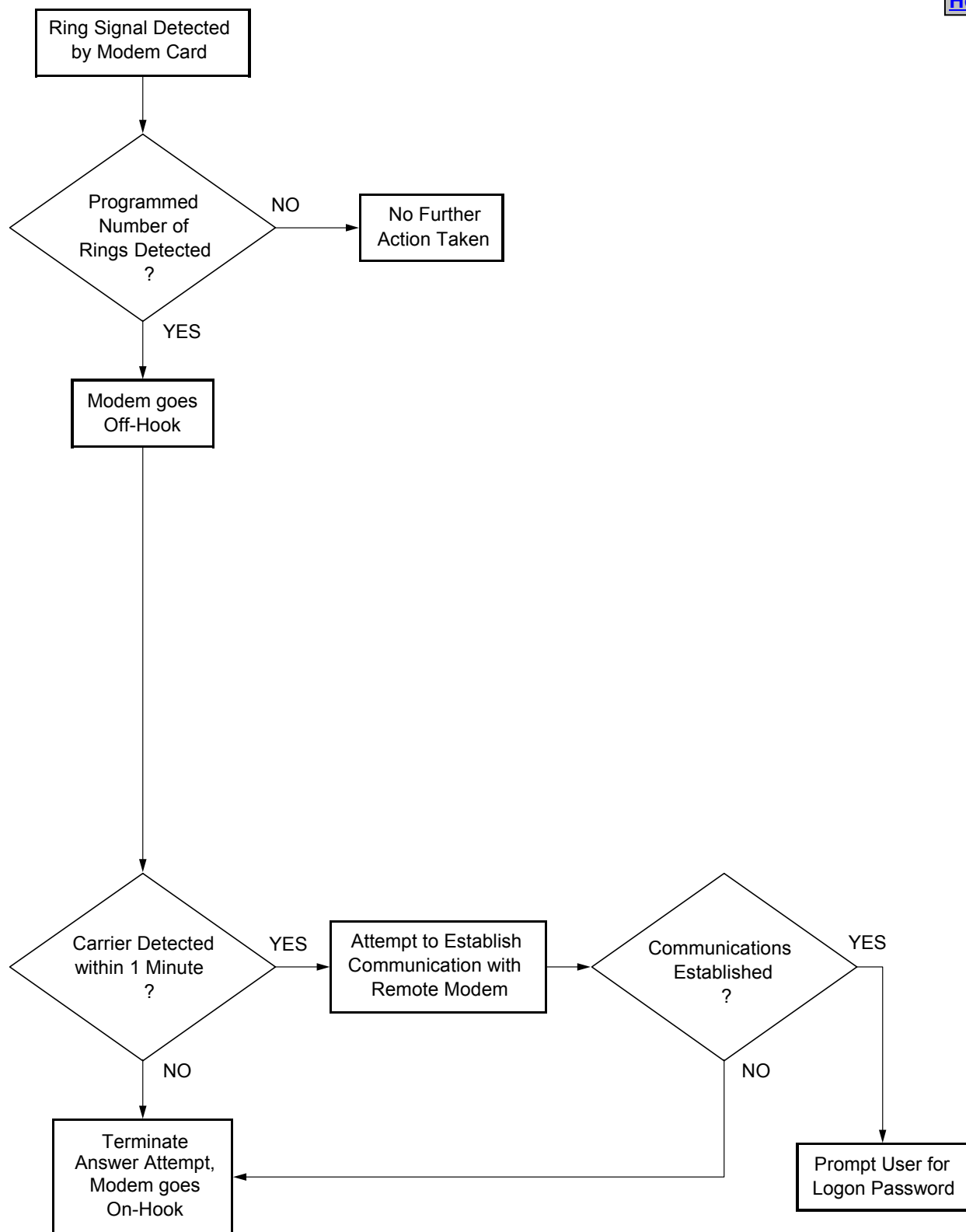


Figure 1 (Sheet 2 of 3)
Modem Operation - Modem Answer Procedure

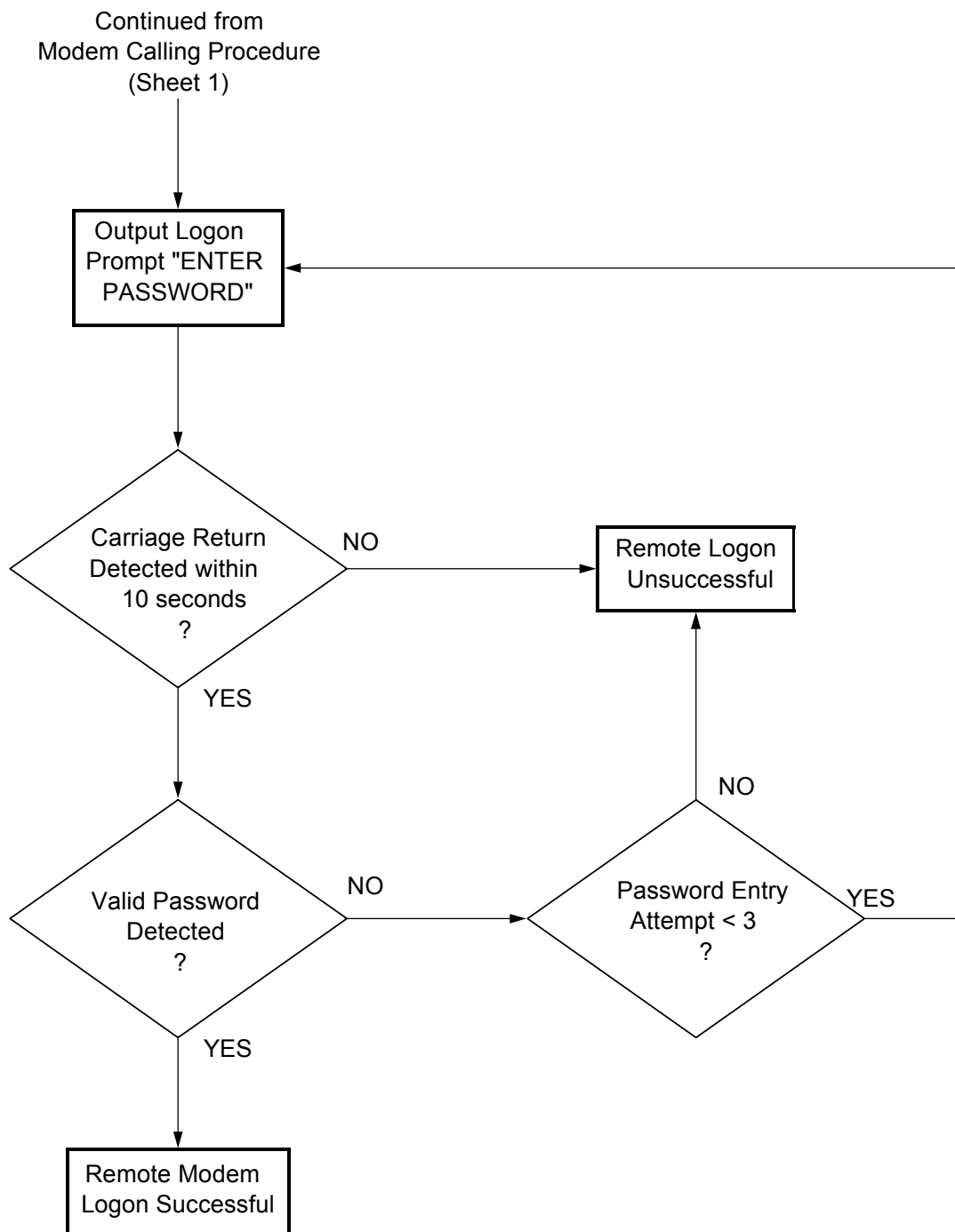


Figure 1 (Sheet 3 of 3)
Modem Operation - Remote Modem Logon Procedure

3. 586505000/586505500 LMS1000 EXPANSION CABINET

3.1 Input Ratings

3.1.1 Input Voltage Range: 20 - 60 Volts DC.

3.1.2 Maximum Input Current: 0.7 Amperes.

3.2 Mounting

3.2.1 586505000 List 6: Furnished reversible mounting angles permit mounting in a 19" or 23" wide relay rack with 1" or 1-3/4" multiple drilling. **586505000 and 586505500 List 7:** Furnished mounting angles permit mounting in a 23" wide relay rack with 1" or 1-3/4" multiple drilling.

3.2.2 Mounting angles may be re-positioned for flush front mounting, 5-inch front projection mounting, or 6-inch front projection mounting.

3.3 I/O Circuit Card Mounting Positions

3.3.1 Provides for mounting of any combination of I/O (analog, binary, relay, and temperature) circuit cards. CARDS MUST BE LOADED LEFT TO RIGHT (AS VIEWED FROM THE FRONT OF THE CABINET). DO NOT SKIP SLOTS.

3.3.2 Contains ten (10) I/O circuit card mounting slots.

3.4 CPU Circuit Card, Part No. 506153 (also used in 582140000, 582140001, and 582126100 Secondary Bays)

3.4.1 General: The CPU circuit card contains the LMS1000 Expansion firmware, a power supply circuit, and communications circuits.

3.4.2 Processor: TMPN3150 - 10MHz.

3.4.3 SRAM - Data: 32K bytes.

3.4.4 Flash - System: 128K bytes.

3.4.5 LMS1000 Network Ports: Four RJ-45 jacks are provided for interconnecting Expansion Cabinets and Expansion Assemblies into the LMS1000 network.

3.4.6 Controls and Indicators: The following controls and indicators are provided on the CPU circuit card. Refer to the Operating Chapter in the User Instructions (Section 5847) for descriptions and locations.

(A) One Power On LED Indicator

(B) One CPU Fail LED Indicator

(C) One CPU Hardware Reset Pushbutton Switch

4. 586505000/586505500 LMS1000 EXPANSION ASSEMBLY

4.1 Input Ratings

4.1.1 Input Voltage Range: 20 - 60 Volts DC.

4.1.2 Maximum Input Current: 0.2 Amperes.

4.2 Mounting

4.2.1 Customer mounted. See ["Overall Dimensions \(Expansion Assembly\)"](#) under PHYSICAL SIZE INFORMATION section for details.

4.3 I/O Connector Pinouts

4.3.1 See ["Connector Locations \(Expansion Assembly\)"](#) under PHYSICAL SIZE INFORMATION.

4.4 CPU Circuit, P/O Part No. 507606

- 4.4.1 **General:** The CPU circuit contains the Expansion Assembly's firmware, a power supply circuit, and communications circuits.
- 4.4.2 **Processor:** TMPN3150 - 10MHz.
- 4.4.3 **SRAM - Data:** 32K bytes.
- 4.4.4 **Flash - System:** 128K bytes.
- 4.4.5 **Analog Inputs:** Provides twenty-four (24) 50mv shunt inputs. $\pm 0.1\%$ from -40°C to $+65^{\circ}\text{C}$.
Common mode voltage between inputs must not exceed -0.15 to $+0.95$ volts.
- 4.4.6 **Binary Inputs:** Provides eight (8) binary inputs.
 - (A) Single-ended input connections, return is $-\text{BAT}$.
 - (B) **Input State:** An applied voltage of 12 to 60 volts, DC, is defined as the CC (contact closed) state. An applied voltage of 2.0 volts or less is defined as the CO (contact open) state. Voltages between 2.0 and 12 volts are undefined.
- 4.4.7 **LMS1000 Network Port:** One RJ-45 jack is provided for interconnecting into the LMS1000 network.

5. INPUT/OUTPUT (I/O) CIRCUIT CARDS

5.1 Four (4) Input Analog Circuit Card, Part No. 506336

- 5.1.1 **General:** Adds four (4) analog inputs to the system.
- 5.1.2 **Inputs:** Monitors 0-50 mv DC (shunts), 0-100 mv DC (shunts), 0-20 ma current loop signals, and voltages from 0 to 60 volts DC. Each input is jumper selectable for either shunt, current loop, or voltage. Two sets of terminals provided for each input. One set for connection of 0-60 volts DC. The other set for connection of 50 mv shunts, 100 mv shunts, and 20 ma current loops.
- 5.1.3 **Channel-to-Channel Isolation:** 60 volts, maximum. Inputs are isolated from each other via an A/D converter block operating from an isolated power supply.
- 5.1.4 **20ma Input:** Polarity Sensitive.
- 5.1.5 **Update Frequency:** Once every 4 seconds.
- 5.1.6 **Accuracy:**
 - (A) Large Signal Inputs (error in absolute volts)
 - (1) 5 to 60 VDC @ $+25^{\circ}\text{C}$: $\pm 0.04\text{V}$
 - (2) 5 to 60 VDC @ -40°C to $+85^{\circ}\text{C}$: $\pm 0.06\text{V}$
 - (3) 0 to 5 VDC @ $+25^{\circ}\text{C}$: $\pm 0.002\text{V}$
 - (4) 0 to 5 VDC @ -40°C to $+85^{\circ}\text{C}$: $\pm 0.006\text{V}$
 - (B) Small Signal Inputs (error as % of transducer full scale)
 - (1) 20 ma current loop transducers @ -40°C to $+85^{\circ}\text{C}$: $\pm 0.1\%$
 - (2) 50 mv and 100 mv shunts @ -40°C to $+85^{\circ}\text{C}$: $\pm 0.1\%$

5.2 Eight (8) Input Analog Circuit Card, Part No. 514528

- 5.2.1 **General:** Adds eight (8) analog inputs to the system.

- 5.2.2 Inputs:** Monitors 0-50 mv DC (shunts).
Common mode voltage between inputs must not exceed -0.15 to +0.95 volts.
- 5.2.3 Channel-to-Channel Isolation:** Not Provided. All 8 channels are referenced to the CH-1 return lead (TB1-2)
- 5.2.4 Update Frequency:** Once every 2 seconds.
- 5.2.5 Accuracy:** @ -40°C to +85°C: $\pm 0.1\%$ (error as % of transducer full scale [50mv]).
- 5.3 Twelve (12) Input Analog Circuit Card, Part No. 520838**
 - 5.3.1 General:** Adds twelve (12) analog inputs to the system.
 - 5.3.2 Inputs:** Monitors individual battery cell voltages.
 - 5.3.3 Update Frequency:** 10 seconds.
 - 5.3.4 Maximum Cell Voltage:** 2.5 volts.
- 5.4 Four (4) Input Binary Circuit Card, Part No. 506332**
 - 5.4.1 General:** Adds four (4) binary inputs to the system. Double-ended input connections.
 - 5.4.2 Maximum Input Voltage:** 60 volts DC.
 - 5.4.3 Channel-to-Channel Isolation:** 60 volts, maximum.
 - 5.4.4 Input State:** An applied voltage of 12 to 60 volts, DC, is defined as the CC (contact closed) state. An applied voltage of 2.0 volts or less is defined as the CO (contact open) state. Voltages between 2.0 and 12 volts are undefined.
 - 5.4.5 Alarm State:** Either the CC or CO state may be configured as the alarm state.
- 5.5 Eight (8) Input Binary Circuit Card, Part No. 506334**
 - 5.5.1 General:** Adds eight (8) binary inputs to the system. Single-ended input connections.
 - 5.5.2 Maximum Input Voltage:** 60 volts DC.
 - 5.5.3 Channel-to-Channel Isolation:** 60 volts, maximum.
 - 5.5.4 Input State:** An applied voltage of 12 to 60 volts, DC, is defined as the CC (contact closed) state. An applied voltage of 2.0 volts or less is defined as the CO (contact open) state. Voltages between 2.0 and 12 volts are undefined.
 - 5.5.5 Alarm State:** Either the CC or CO state may be configured as the alarm state.
- 5.6 Four (4) Output Form-C Relay Circuit Card, Part No. 506335**
 - 5.6.1 General:** Adds four (4) Form-C relay output contacts to the system.
 - 5.6.2 Relay Contacts:** 4 sets.
 - 5.6.3 Contact Arrangement:** Form-C.
 - 5.6.4 Contact Rating:** Contacts are rated for 0.6A at 125 VAC, 0.5A at 110 VDC, 2.0A at 30 VDC.
 - 5.6.5 Channel-to-Channel Isolation:** 177 volts, maximum.
- 5.7 Eight (8) Input Temperature Circuit Card, Part No. 506333**
 - 5.7.1 General:** Adds eight (8) temperature inputs to the system.
 - 5.7.2 Accuracy:** $\pm 0.5^{\circ}\text{C}$, from -10°C to $+85^{\circ}\text{C}$.

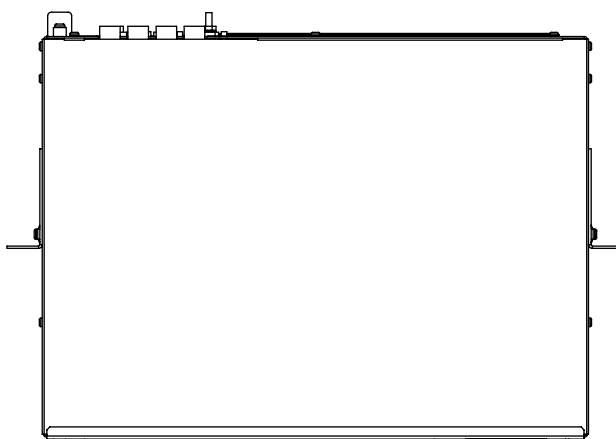
PHYSICAL SIZE INFORMATION

Overall Dimensions

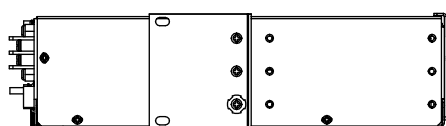
(586505000 Main [List 1] and Expansion [List 6] Cabinets)

NOTES

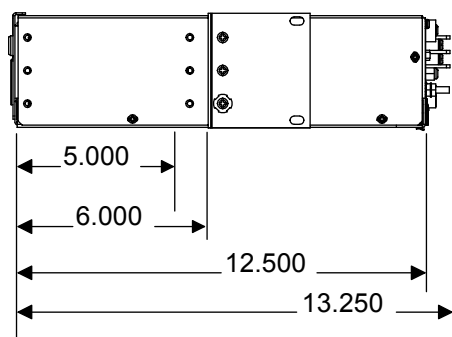
1. All Dimensions are in Inches
Unless Otherwise Specified
2. Finish: Off-White (M500-117)
3. Weight in Lbs
Cabinet
Net: 17
Shipping: 21
Circuit Cards, Maximum, Each
Net: 0.5
Shipping: 1.5
4. Mounting Angles May Be Positioned Flush
Front Mounting, 5-Inch Front Projection
Mounting or 6-Inch Projection Mounting



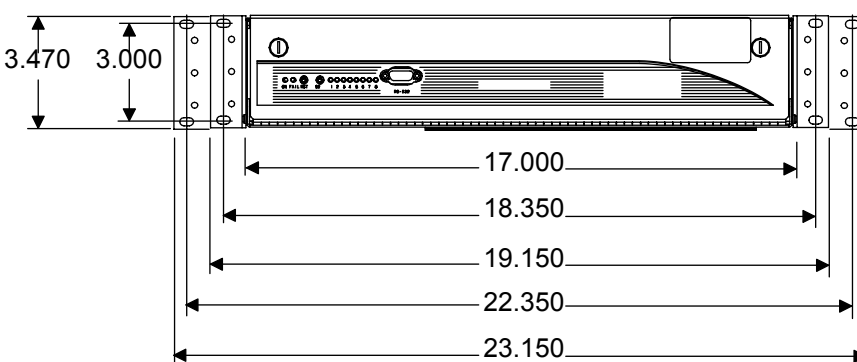
TOP VIEW



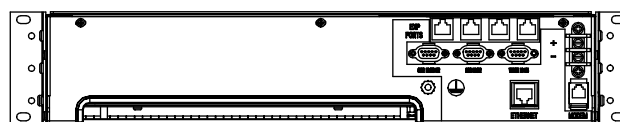
LEFT SIDE VIEW



RIGHT SIDE VIEW



FRONT VIEW

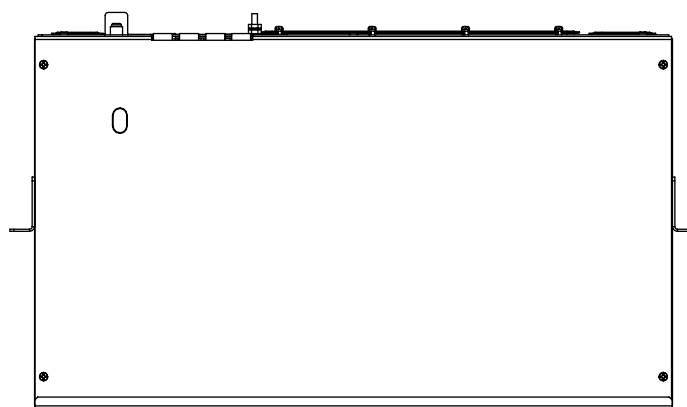


REAR VIEW

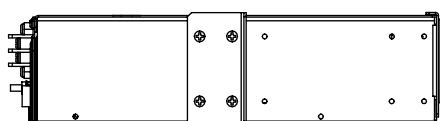
Overall Dimensions (586505000/586505500 Main [List 2] and Expansion [List 7] Cabinets)

NOTES

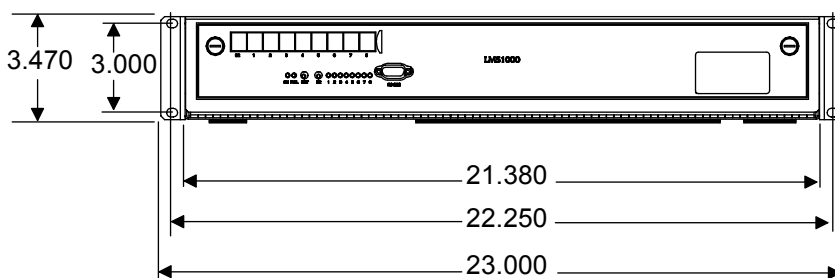
1. All Dimensions are in Inches
Unless Otherwise Specified
2. Finish: Off-White (M500-117) for 586505000
Textured Gray (M500-147) for 586505500
3. Weight in Lbs
Cabinet
Net: 17
Shipping: 21
Circuit Cards, Maximum, Each
Net: 0.5
Shipping: 1.5
4. Mounting Angles May Be Positioned Flush
Front Mounting, 5-Inch Front Projection
Mounting or 6-Inch Projection Mounting



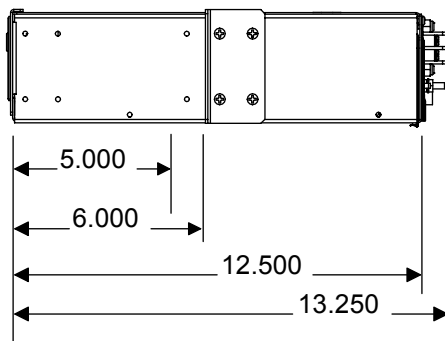
TOP VIEW



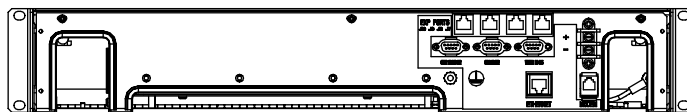
LEFT SIDE VIEW



FRONT VIEW

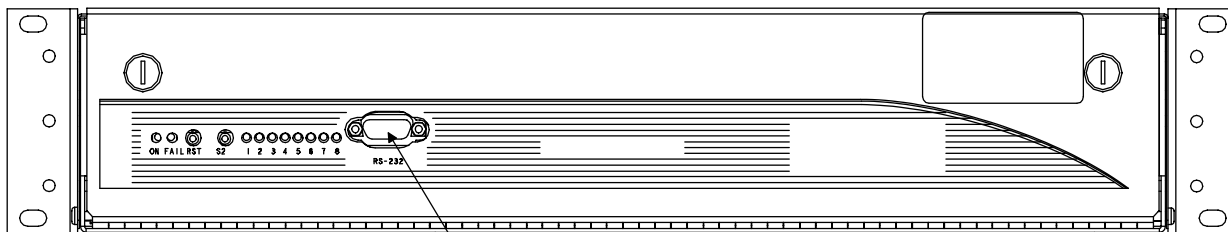


RIGHT SIDE VIEW



REAR VIEW

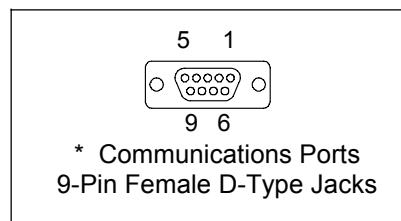
Connector Locations (586505000/586505500 Main Cabinet)



Front View
 (Main Cabinet)
 (19" Cabinet Shown)

RS-232
 (Located on CPU Circuit Card,
 Accessible through Front Door)
 9-Pin Female D-Type Connector

For Local Terminal Connection



* Communications Ports
 9-Pin Female D-Type Jacks

List 60/61:
 LMS Front Panel Display Port
 or
 List 84:
 External GPS Modem Port

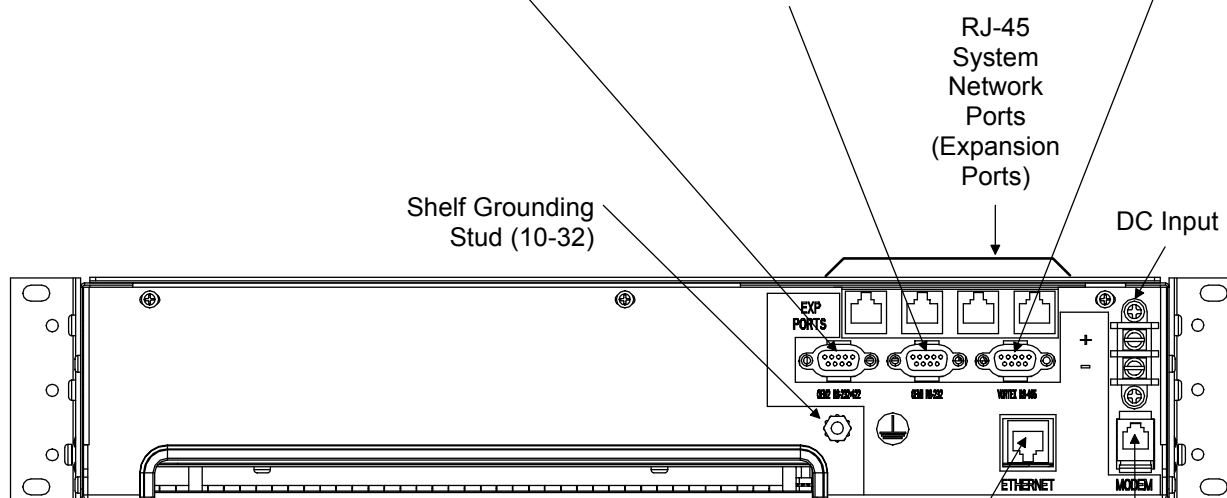
List 85:
 AC Analyzer Port
 or
 List 86:
 TL1/X.25 Port
 or
 List 88:
 Local Port Redirection
 or
 List 79:
 Gateway Port

Always Vortex
 (VPS) Port
 and
 List 80:
 Door Access Controller Port
 (use 'Y' cable to also connect
 VPS to same port)

RS-232/422
 OEM 2 Port*

RS-232
 OEM 1 Port*

RS-485 (Vortex)
 OEM 3 Port*



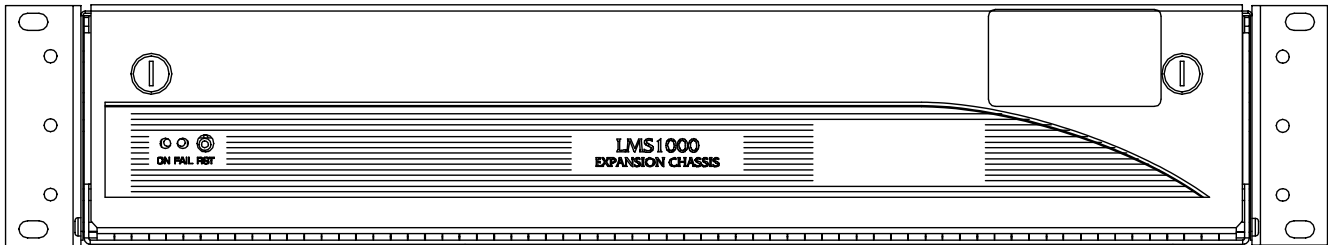
Rear View
 (Main Cabinet)
 (19" Cabinet Shown)

Access Opening and Cable Channel
 for Connections to I/O Circuit Cards
 and External CPU/Hardware Fail Alarms

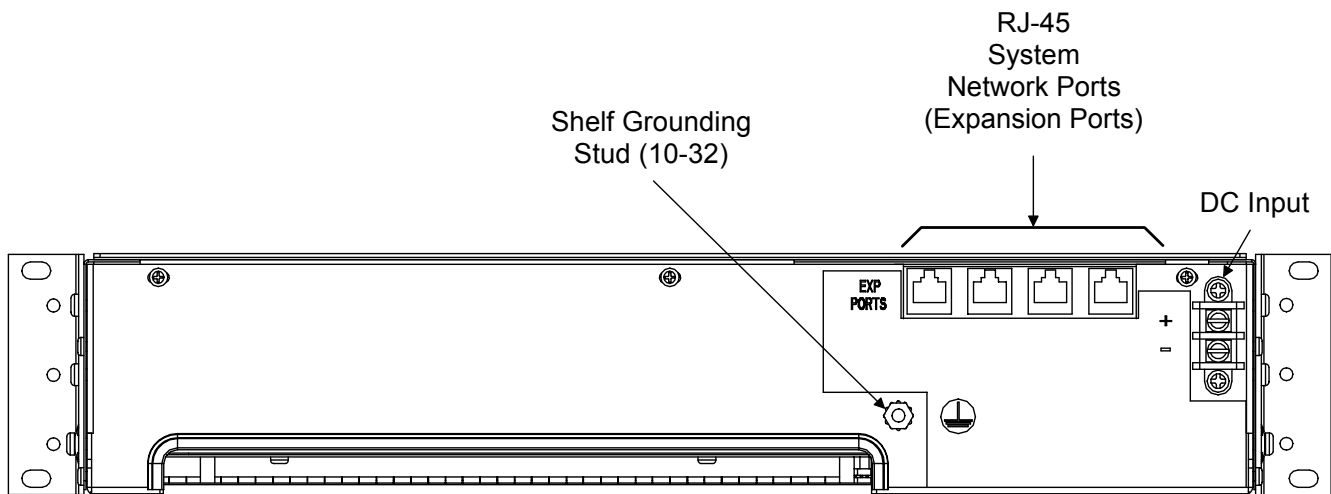
RJ-45
 ETHERNET
 Port

RJ-11
 Phone Line
 (active only if
 modem installed)

Connector Locations (586505000/586505500 Expansion Cabinet)



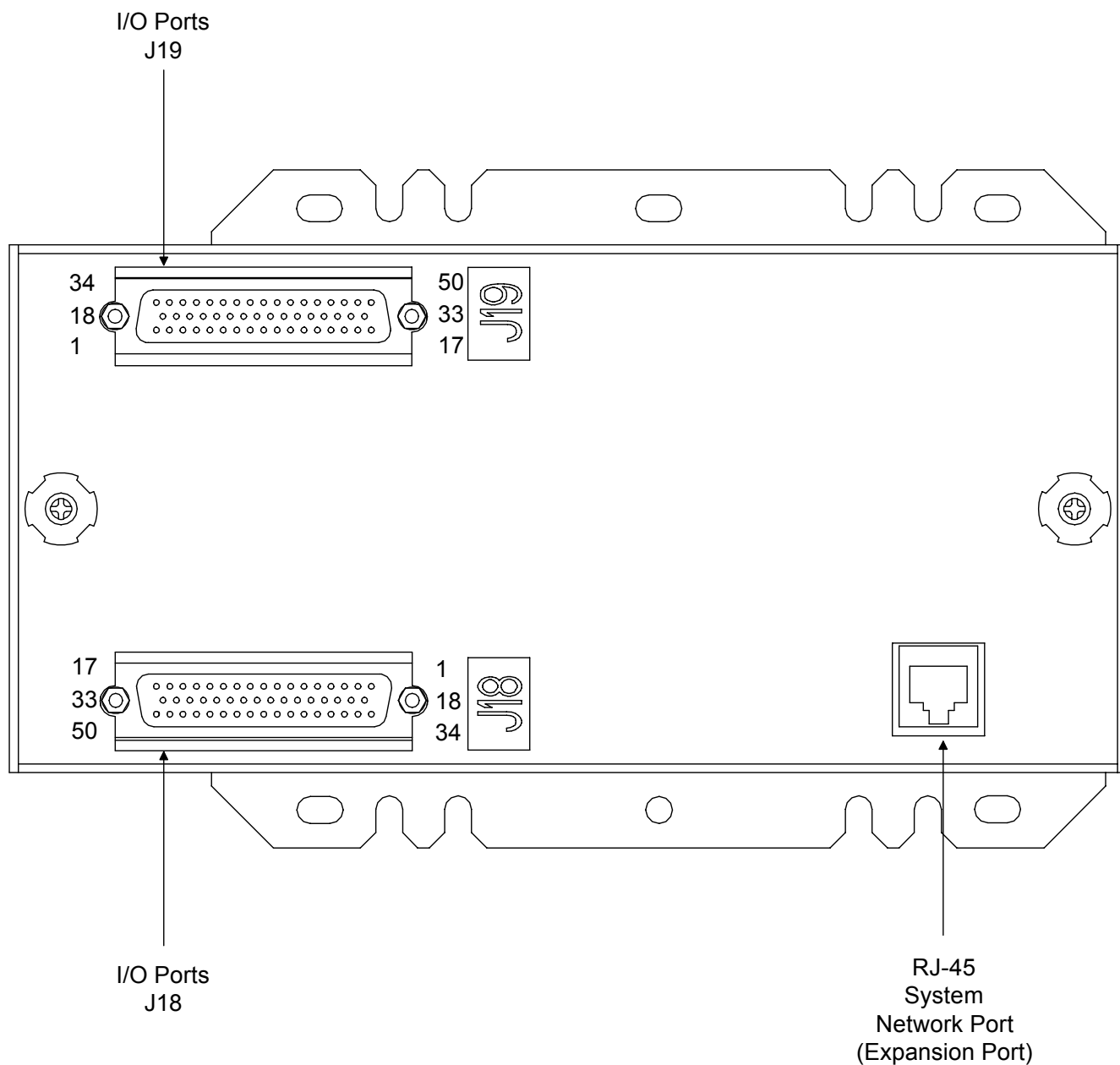
Front View
(Expansion Cabinet)
(19" Cabinet Shown)



Rear View
(Expansion Cabinet)
(19" Cabinet Shown)

Access Opening and Cable Channel
for Connections to I/O Circuit Cards

Connector Locations (586505000/586505500 Expansion Assembly)



| CONNECTOR J18 PIN | FUNCTION | CONNECTOR J18 PIN | FUNCTION |
|----------------------|----------------------------|----------------------|----------------------------|
| 1 | Binary Input Channel 4 | 26 | Shunt Input, Channel 4 (+) |
| 2 | Binary Input Channel 3 | 27 | Shunt Input, Channel 2 (-) |
| 3 | Binary Input Channel 1 | 28 | Shunt Input, Channel 1 (+) |
| 4 | Battery Return | 29 | not used |
| 5 | Battery | 30 | not used |
| 6 | Circuit Ground | 31 | not used |
| 7 | Shunt Input, Channel 8 (+) | 32 | not used |
| 8 | Shunt Input, Channel 6 (-) | 33 | not used |
| 9 | Shunt Input, Channel 5 (+) | 34 | Frame Ground |
| 10 | Shunt Input, Channel 3 (-) | 35 | Frame Ground |
| 11 | Shunt Input, Channel 2 (+) | 36 | Binary Input Channel 6 |
| 12 | not used | 37 | Binary Input Channel 8 |
| 13 | not used | 38 | not used |
| 14 | not used | 39 | not used |
| 15 | not used | 40 | not used |
| 16 | not used | 41 | Shunt Input, Channel 7 (-) |
| 17 | not used | 42 | Shunt Input, Channel 6 (+) |
| 18 | Binary Input Channel 5 | 43 | Shunt Input, Channel 4 (-) |
| 19 | Binary Input Channel 7 | 44 | Shunt Input, Channel 3 (+) |
| 20 | Binary Input Channel 2 | 45 | Shunt Input, Channel 1 (-) |
| 21 | Battery Return | 46 | not used |
| 22 | Battery | 47 | not used |
| 23 | Shunt Input, Channel 8 (-) | 48 | not used |
| 24 | Shunt Input, Channel 7(+) | 49 | not used |
| 25 | Shunt Input, Channel 5 (-) | 50 | not used |

| CONNECTOR J19 PIN | FUNCTION | CONNECTOR J19 PIN | FUNCTION |
|----------------------|-----------------------------|----------------------|-----------------------------|
| 1 | Shunt Input, Channel 23 (-) | 26 | Shunt Input, Channel 12 (+) |
| 2 | Shunt Input, Channel 22 (+) | 27 | Shunt Input, Channel 9 (-) |
| 3 | Shunt Input, Channel 20 (-) | 28 | Shunt Input, Channel 9 (+) |
| 4 | Shunt Input, Channel 19 (+) | 29 | not used |
| 5 | Shunt Input, Channel 17 (-) | 30 | not used |
| 6 | Shunt Input, Channel 17 (+) | 31 | not used |
| 7 | Shunt Input, Channel 15 (-) | 32 | not used |
| 8 | Shunt Input, Channel 14 (+) | 33 | not used |
| 9 | Shunt Input, Channel 12 (-) | 34 | Shunt Input, Channel 24 (-) |
| 10 | Shunt Input, Channel 11 (+) | 35 | Shunt Input, Channel 24 (+) |
| 11 | Shunt Input, Channel 10 (-) | 36 | Shunt Input, Channel 21 (-) |
| 12 | not used | 37 | Shunt Input, Channel 20 (+) |
| 13 | not used | 38 | Shunt Input, Channel 18 (-) |
| 14 | not used | 39 | Shunt Input, Channel 16 (+) |
| 15 | not used | 40 | Shunt Input, Channel 14 (-) |
| 16 | not used | 41 | Shunt Input, Channel 13 (+) |
| 17 | not used | 42 | Shunt Input, Channel 11 (-) |
| 18 | Shunt Input, Channel 23 (+) | 43 | Shunt Input, Channel 10 (+) |
| 19 | Shunt Input, Channel 22 (-) | 44 | not used |
| 20 | Shunt Input, Channel 21 (+) | 45 | not used |
| 21 | Shunt Input, Channel 19 (-) | 46 | not used |
| 22 | Shunt Input, Channel 18 (+) | 47 | not used |
| 23 | Shunt Input, Channel 16 (-) | 48 | not used |
| 24 | Shunt Input, Channel 15 (+) | 49 | not used |
| 25 | Shunt Input, Channel 13 (-) | 50 | not used |

RELATED DOCUMENTATION

Schematic Diagram: SD586505000/SD586505500

Instructions:

- Section 5847 (LMS1000 User Instructions)
- Section 5879 (LMS1000 Installation Instructions)
- Section 5877 (582140000 NETSURE Power System User Instructions)
- Section 5876 (582140000 NETSURE Power System Installation Instructions)
- Section 6016 (582140001 NETSURE Power System User Instructions)
- Section 6017 (582140001 NETSURE Power System Installation Instructions)
- Section 6027 (582126100 NETSURE Power System User Instructions)
- Section 6028 (582126100 NETSURE Power System Installation Instructions)
- Section 5942 (586505000 List 60 and 586505000/586505500 List 62 Front Panel Display Option Instructions)
- Section 5943 (586505000 List 61 and 586505000/586505500 List 63 Front Panel Display Option Instructions)
- Section 5944 (LMS1000 I/O Circuit Cards Installation Instructions)

[Home](#)

REVISION RECORD

| Issue | Change Number (ECO) | Description of Change | Date | Approved |
|-------|---------------------|---|----------|--|
| AT | LLP212240 | LMS Dual MCA Interface Software Option added. Spec. No. 582126100 added. LPS (Lorain Power System) changed to NPS (NETSURE™ Power System). Vortex® Power System (VPS) changed to NETSURE™ Power System (NPS). | 04/15/09 | John Jasko |
| AU | LLP213082 | Updates for LMS Firmware 9.1 and MCA version 2.2. | 05/10/10 | John Jasko John Jasko May 10, 2010 Jerry Crouse May 10, 2010 |

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In Mexico:

Emerson Network Power de Mexico, S.A. de C.V.
Apartado Postal 77001 / Mexico 10 D.F., MX 11200 / (52) 55-9140-6750

